

[UNIT - 1] Swachh Bharath - an Environmental Awakening

Introduction :- Slogan - One step towards cleanliness.

Swachh Bharat Abhiyan is started by the government to make India a completely Clean India.

→ Clean India was a dream seen by the Mahatma Gandhi regarding which he said that, "Sanitation is more important than Independence".

→ Unfortunately, India became lack of cleanliness and sanitation even after 67 yrs of Independence. Less people use toilet.

→ Swachh Bharat Abhiyan

→ It is a cleanliness campaign (govt. of India)

→ This covers 4041 statutory towns in order to clean roads, streets, and infrastructure of India.

→ It is a mass movement has run to create a clean India by 2019 (150th Birth Anniversary of Bapu).

→ Launched - 2nd Oct 2014 (Delhi)

→ The first cleanliness drive of this mission was started by the PM of India, Sir/Shree Narendra Modi earlier to his launch in (on 25th Sept 2014)

→ The expected cost over 62000 crores.

→ The project was "beyond politics" and "inspired by patriotism".

Objectives

→ Construction of Individual, Cluster and community toilets.

→ To eliminate or reduce open defecation.

→ Public Awareness (Monitoring toilet use)

→ To keep villages clean. Solid & liquid waste management through Gram Panchayat.

→ The lay water pipelines in all villages by 2019.

→ Making India open d.

→ Making provisions for the supply of clean energy fuel LPG to all households in rural India to reduce domestic pollution.

→ Promoting the use of non-conventional energy resources, like wind & solar energy.

Swachh Bharat Mission in Urban Areas

→ Aims to cover almost 1.04 crore households

Provide them → 2.6 Lakh public toilets (Bus/railways)

→ 2.5 Lakh community toilet (Society)

→ Complete waste management

→ This covers almost 4,401 towns.

→ Total Expenditure on Urban Areas

7,366 cr on
Solid waste
management

1,828 cr on
Public
awareness

655 cr on
community
toilet

4,165 cr on
Individual
household toilet

Rural Swachh Bharat Mission

→ Aims to implementing cleanliness programmes in rural areas.

→ This aims to make rural area free from defecation till 2019.

* 34,000 crs to

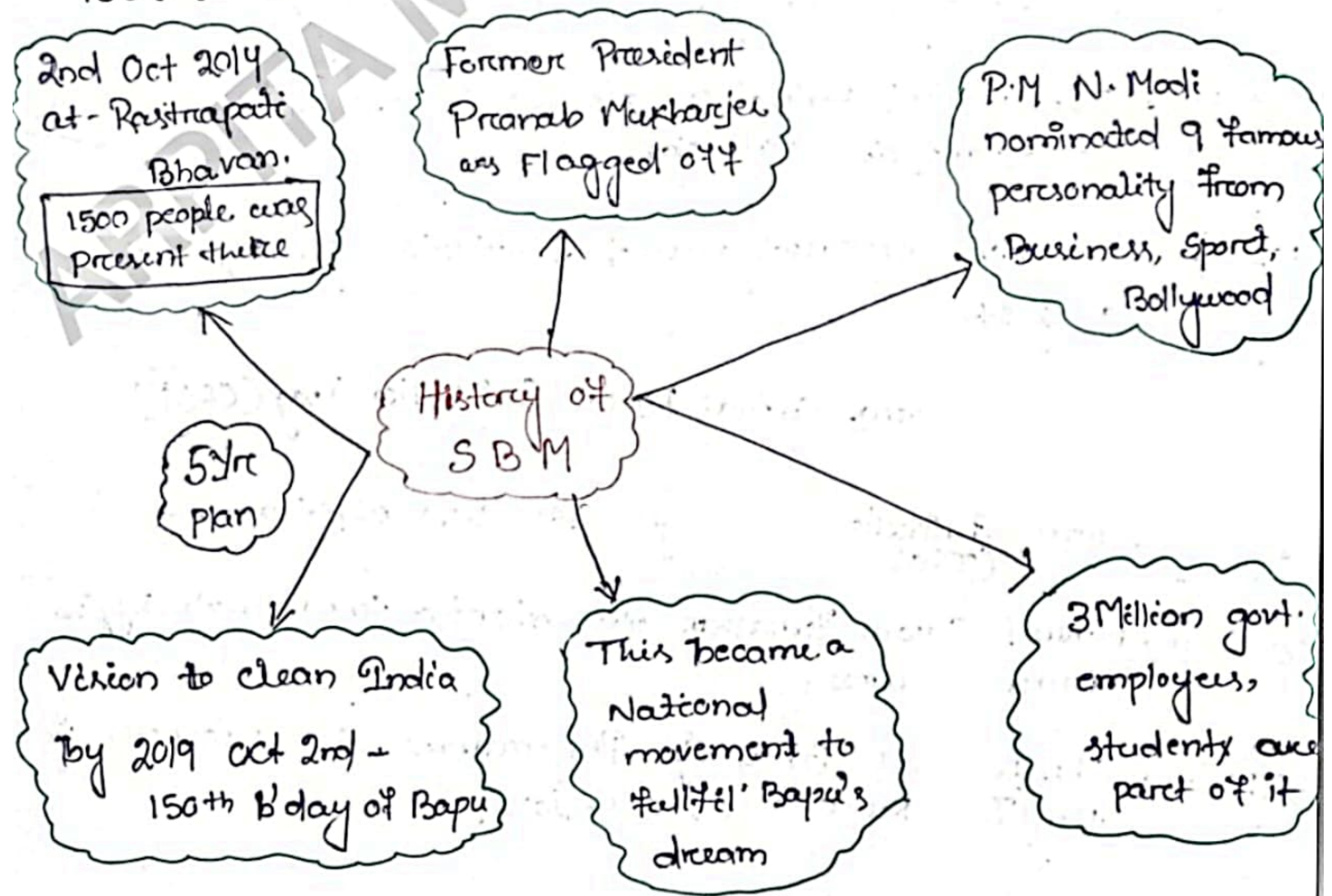
11 cr, 11 Lakh toilets in the country,

→ There is a big plan of converting waste into bio-fertilizer and useful energy form.

→ The mission involves the participation of → gram panchayat.
→ Panchayat Samiti.
→ Zilla Parishad.

Objectives

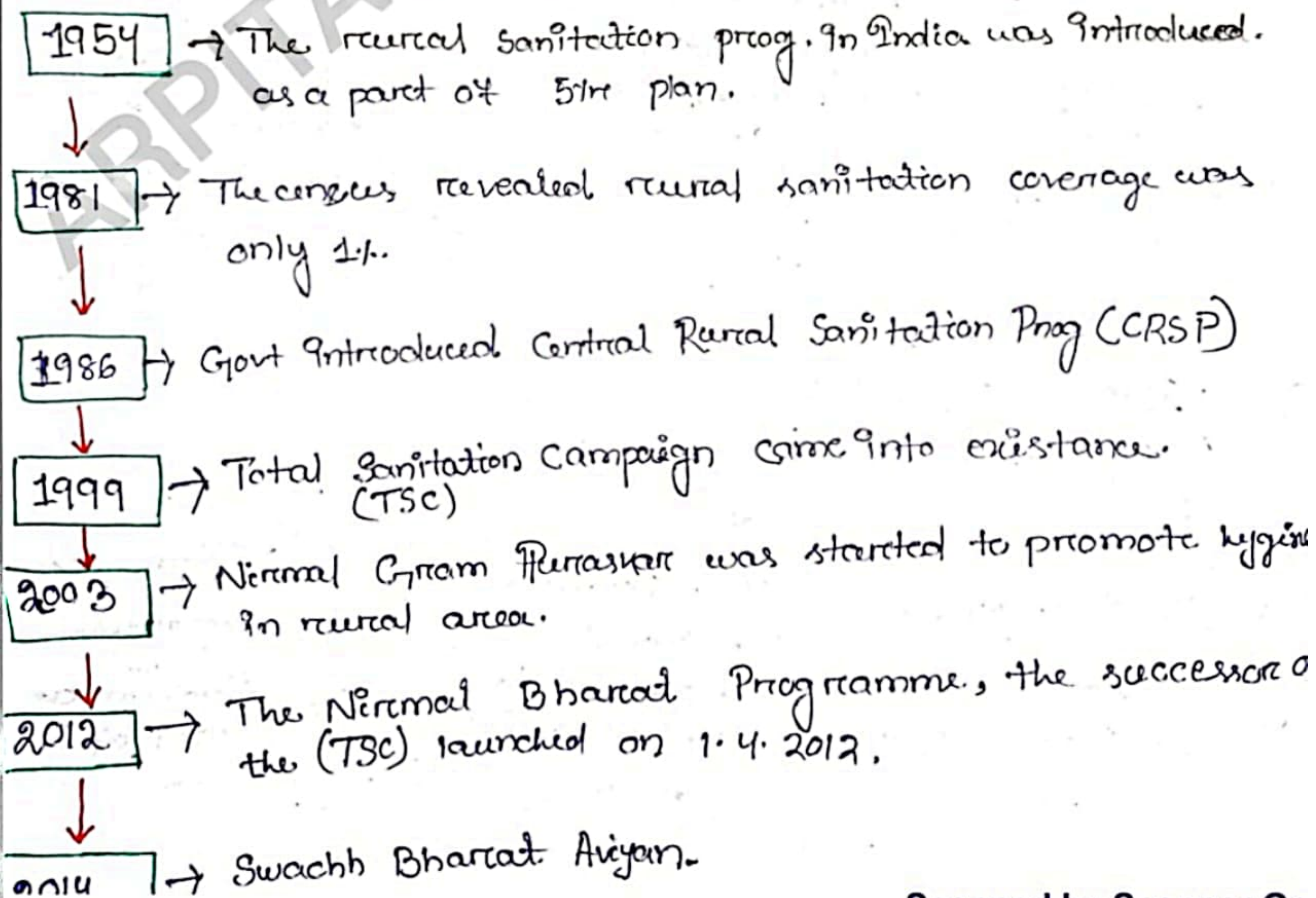
- Improves the quality of living style.
- Motivate the people to maintain sanitation.
- Motivate local bodies to provide sanitation facilities.
- Focus on solid & liquid waste management.
- To promote ecologically safe and sustainable sanitation in the rural areas.



The Nine public figures selected By PM Modi include

- ① Comedian Kapil Sharma
- ② Former Captain of Ind. Cricket team Sourav Ganguly
- ③ Former IPS Kiran Bedi
- ④ Padmanav Acharya (Prof. NITIE)
- ⑤ Nagaland Governor Somai Mahingh.
- ⑥ Classical dancer Ramoji Rao
- ⑦ Artoon Purie of the India Today group
- ⑧ Industrialist Anil Ambani
- ⑨ Actor Kamal Hasan / Salman Khan.

Evolution of the concept Swachh Bharat Aayam :-



Execution Of The Swachh Bharat Project

- The 'Swachh Bharat Aayn' has 2 submissions
 - SBA (Rural)
 - SBA (Urban)
- For the execution ministries work together are:
 - ① Ministry of rural development
 - ② Ministry of urban development
 - ③ Ministries of drinking water & sanitation
- Ministry of rural development will provide Rs 20 Lakh to each village each year for next 5 yr. So that every individual household will ample 12,000 for latrine.
- Ministry of Drinking water and Sanitation will expected to provide 1,34,000 cr.
- SBA on Urban Sector, aims to provide individual, community & public toilet including waste management.
- The Urban development ministry has allocated Rs 62,000 Cr for this project.

Major Issues

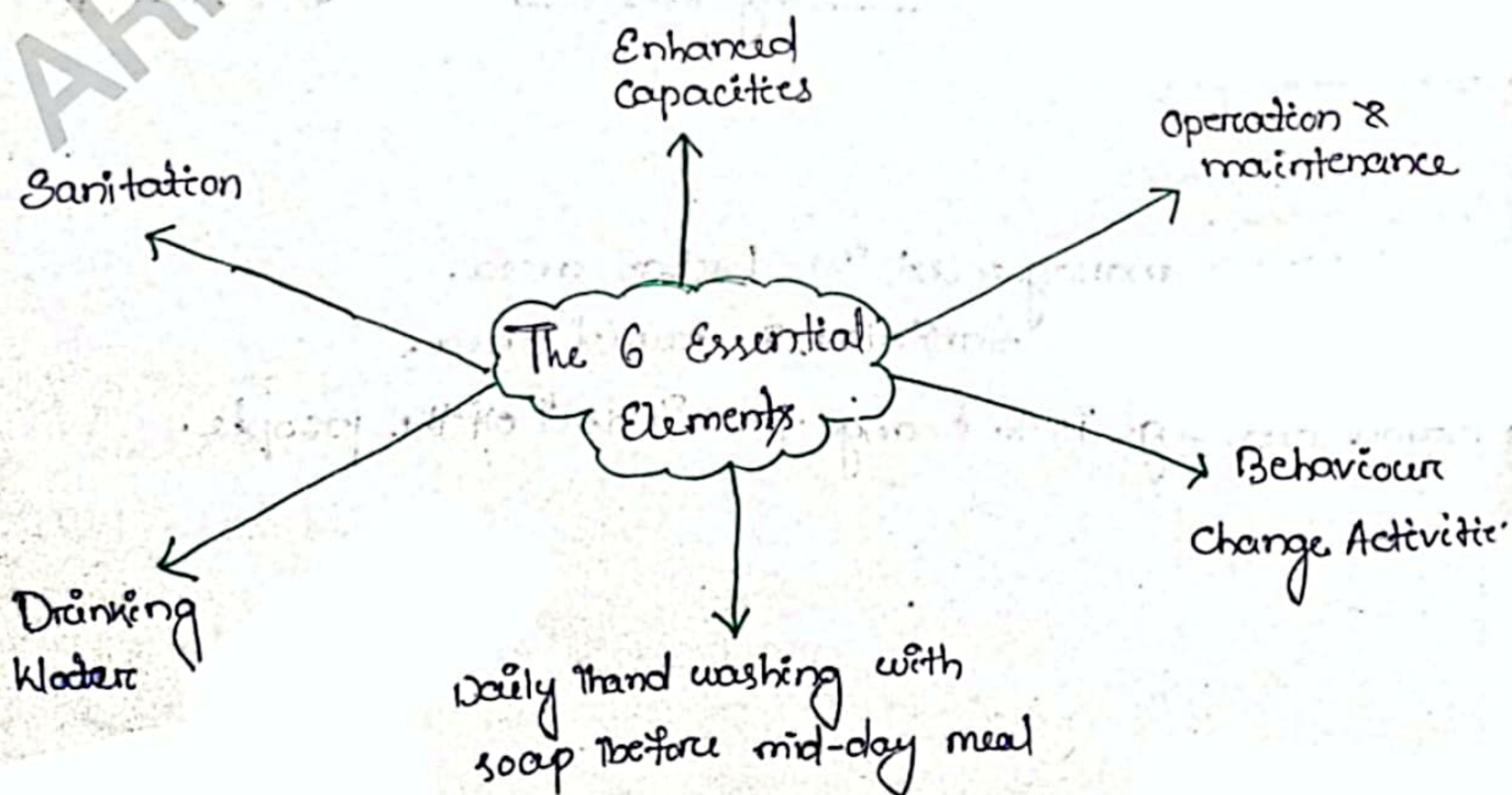
- Solid waste management in Urban area.
- Lack of adequate sanitation in rural area.
- Major challenge is to change the mindset of the people.

'Integration Of Swachh Bharat Campaign With Educational Institution

The Swachh Bharat - Swachh Vidyalaya campaign of the Union MHRD is being organised during 25th Sept, 2014 to 31st Oct 2014 in KVs and NVs.

The activities to be taken up during the period include -

- Teach the student about M. Gandhi's teaching on cleanliness & hygiene.
- Cleaning classroom, labs, libraries, toilet, drinking water areas, statues installed in school, play ground, garden etc.
- Annual maintenance of the school buildings including white wash and painting.
- Organize essay, debates, paintings, competitions on hygiene and cleanliness.



Strategies :-

① Sanitation :-

- Separate toilets for boys & girls, with one unit generally having one toilet plus 3 urinals.
- The ratio to be maintained is preferably one unit for every 40 students.
- Menstrual hygiene management facilities must be available.

② Daily hand washing with soap before mid-day meal :-

- Sufficient group hand washing facilities groups of 10-12 students to wash hands at same time.
- The washing station should be simple, clean and relying on usage of minimum water.
- The students must be trained with adequate hand washing techniques.

③ Drinking Water :-

- Daily provision of child-friendly and sustainable safe drinking water and adequate water for hand washing.
- In addition water for school cleaning and also food preparation and cooking.

④ Behaviour change activities :-

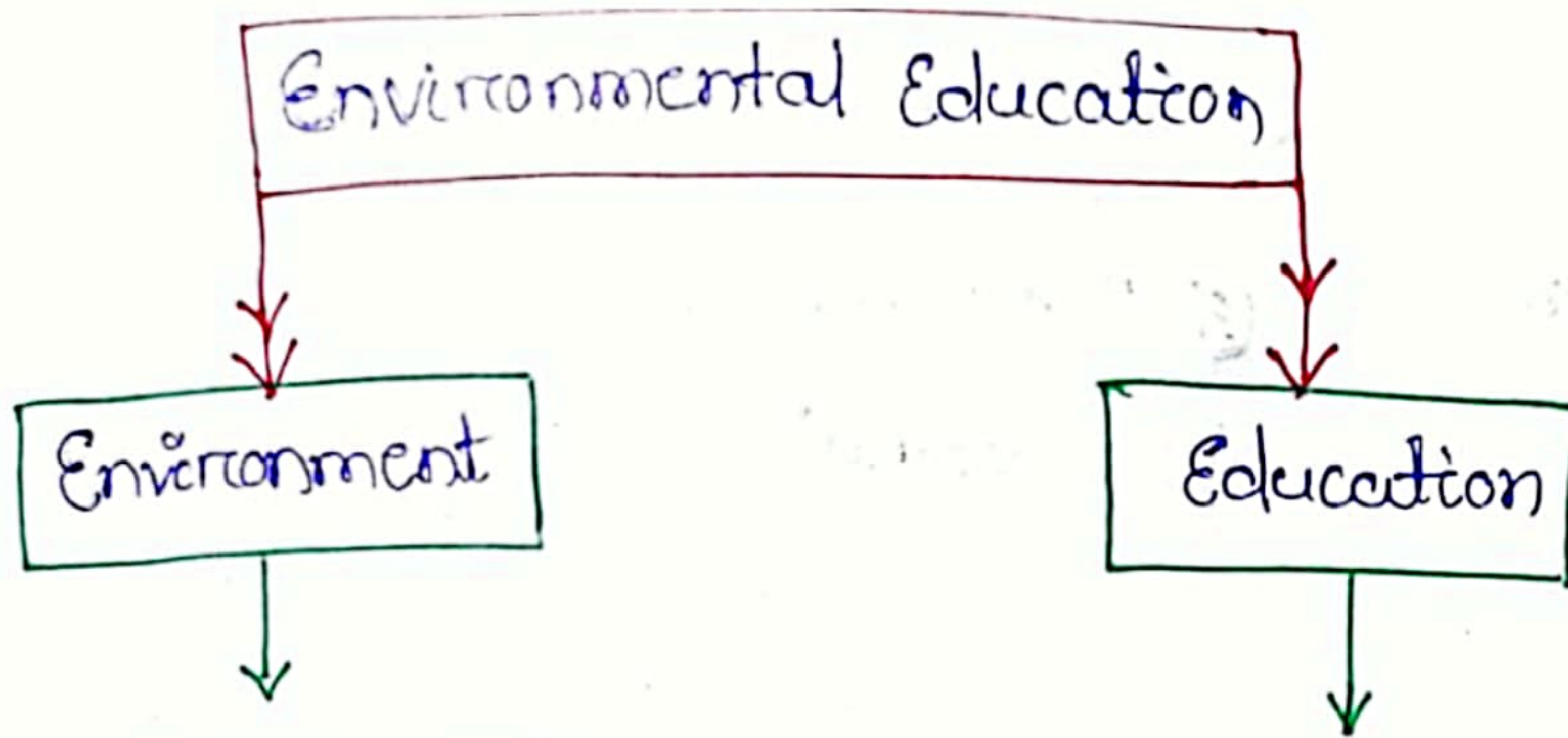
- Water, sanitation and hygiene behaviour change communication activities should be part of the daily routine of all children.
- Girls must be taught menstrual hygiene management by female teachers.

⑤ Enhanced Capacities :-

→ It is essential that capacities are improved at various levels within the sector, to develop the daily routine with right mix of skills, knowledge and experience to facilitate all hygiene programmes in schools effectively.

A general checklist of maintenance schedule is as follows

- ① Daily Maintenance → Toilets, doors, water logging, ~~dem~~ bench, kitchen area etc.
- ② Weekly Maintenance → Tap leaks, flushing systems, blockage, drainages, clearing dusts, locks etc.
- ③ Monthly Maintenance → First aid kit, Lab-assessories, any crack in roof / walls, Manhole-covers, tank covers etc.
- ④ Seasonal / quarterly maintenance → Under ground tank, seals, covers, cracks etc.
(before Monsoon)
- ⑤ Annual maintenance → General repair, maintenance work, plaster work, painting work, Repair blackboard, electrical repairing etc.
(During vacation)



The sum total of all living & non-living factors that surround & influence the survival & development of an organism.

System of imparting knowledge and Information.

UNIT-2

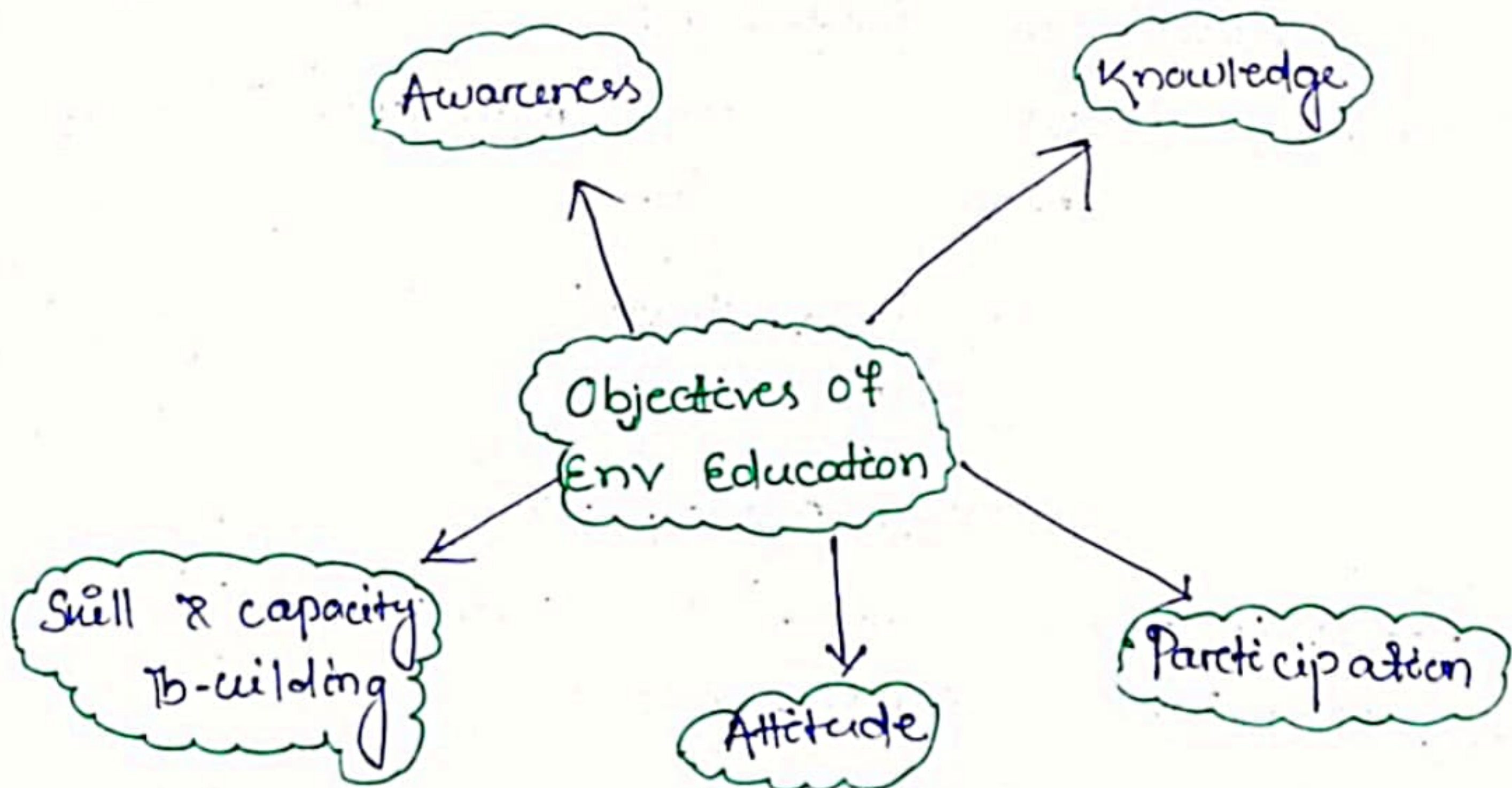
Objectives, Scope and Nature of Environmental Education

Environmental Education:-

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment.

The Components of Environmental Education

- ① Awareness and sensitivity
- ② Knowledge and Understanding
- ③ Attitude of concern & motivation
- ④ Skill to identify & resolve the environmental challenges.
- ⑤ Participation initiatives.



Characteristics Of Environmental Education :-

- Explore the complex relationships that exist between humans, the built environment, and natural systems.
- Teach students more about "how to think" and less of "what to think".
- Allow students to learn from previous knowledge which could then support further learning.
- Be user-friendly and designed to meet the needs of the state's educators.
- E.E should be centered on practical problems related to real life.
- E.E should be integrated into the whole system of formal education at all levels.

Features Of Environmental Education :-

- E.E is a learning process that expands individuals' information and mindfulness about nature's domain.
- It is an inter-disciplinary field that integrates biology, geology, geography, math etc.
- Leads to responsible individual & group action.
- Allows people to discuss about complex environmental problems that have no simple answers.
- Works to help you think critically.
- Increases higher level thinking skills.

Guiding Principles of Environmental Education

1. Resource Principle
2. Soil Principle
3. Wildlife Protection Principle
4. Environmental management Principle
5. Other Principles

What is Environmental degradation?
(ବିନିବିଧୀକରଣ)

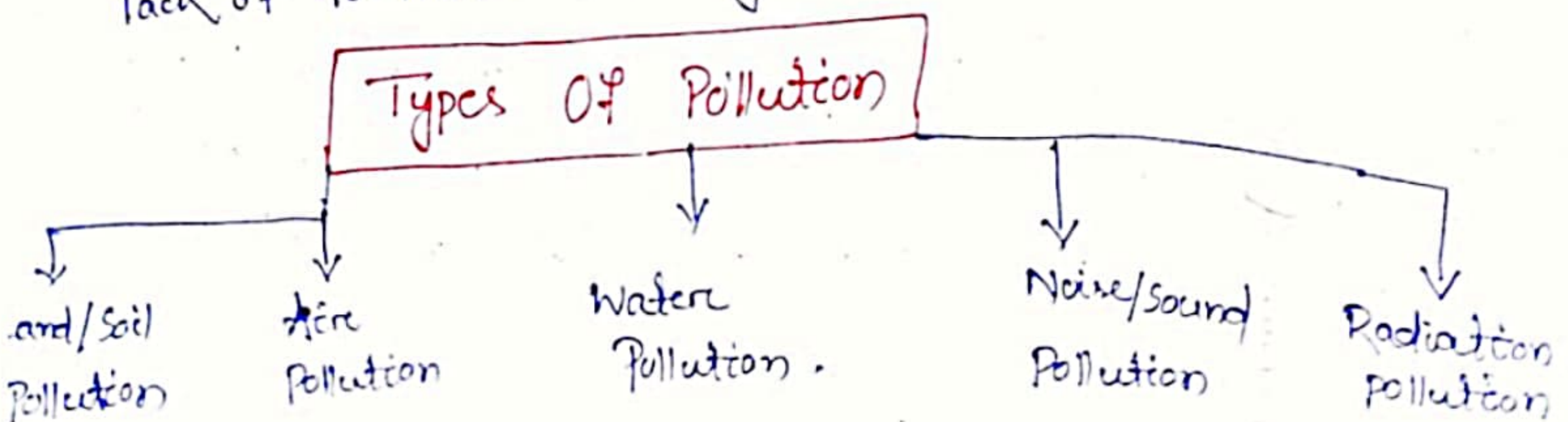
Environmental degradation is the disintegration of the earth or deterioration (କ୍ଷତିବିଧି) of the environment through consumption of assets, for example - air, water & soil; the destruction of environment & eradication (ନିର୍ମୂଳକରଣ) of wildlife.

Causes of Environmental Degradation :-

- ① Land Disturbance
- ② Pollution
- ③ Over Population
- ④ Landfills
- ⑤ Deforestation
- ⑥ Natural Causes

Effects of Environmental Degradation

- ① Impact on Human Health :- Respiratory problem & asthma.
- ② Loss of Biodiversity :- Deforestation, global warming, over population and pollution are few of the major causes for loss of biodiversity.
- ③ Ozone Layer Depletion :- Ozone layer protect us from UV ray of Sun. As it will deplete, it will emit harmful radiations back to earth & skin cancer will cause.
- ④ Loss of Tourism Industry :- Loss of green covers, loss of biodiversity, huge landfills, pollution & population, increasing natural calamity can be a big turn off for most of the tourists.
- ⑤ Economic Impact :- This may ~~also~~ cause because of lack of tourism industry.



SOIL POLLUTION

Definition :-

"Soil or land pollution refers to any physical or chemical changes in the soil."

Sources of soil pollution :-

Soil pollution is caused by its misuse through direct or indirect introduction of substances on its surface. Soil pollution is caused by solid waste and chemicals.

Hence the major sources of soil pollution can be categorised as:-

- (i) Domestic / commercial wastes.
- (ii) Modern Agriculture.
- (iii) Smelting & mining complexes.
- (iv) Industrial waste.

(i) Domestic & commercial waste :-

→ Some common examples of domestic and commercial waste are food scraps, vegetable remains, worn-out furniture, bones of dead animals, plastics, leather, rubber, polythene, bags, metals, construction rubbish, paper, rags etc.

→ Another soil pollutant from domestic unit, which carry ammonia, nitrogen, urea, uric acid is called human excreta.

→ With increase of economic development, the quantity of domestic and commercial wastes is rising rapidly.

→ These wastes can contaminate air, water & land with excess nutrients & toxins.

(ii) Modern Agriculture:-

- Modern agriculture is responsible for polluting the soil through the non-judicious use of chemical fertilizers, pesticides, insecticides, fungicides etc.
- Most of these chemicals are stable.
- This pesticide has been found to be a serious eye, kidney & liver disorder.

(iii) Smelting and mining complexes:-

- Smelting & mining complexes are another significant source of soil pollution.
- The most common examples of pollutants which come from mining are heavy metals like zinc, lead, copper, cadmium, nickel etc.
- They are toxic to plants and may inhibit their growth.
- Their accumulation in plants makes the plant unsafe for human and animal consumption.

(iv) Industrial wastes

- The major sources of soil pollution are the industries such as pulp mills, oil refineries, sugar mills, chemical and fertilizer manufacturing units.
- Plastic and rubber producing industries, iron and steel plants are producing large amount of solid wastes which are dumped on land or burnt.

- These wastes are affecting soil quality.
- Most industrial furnances, especially the power plant produced fly ash which is the major cause of soil pollution and surrounding area.
- Solid wastes, fly ash litters are thrown away by such industries from huge mounds which spoil the landscape.

Effect of soil pollution:-

- Regular use of fertilizers causes so many diseases related to kidney, liver or intestine.
- This disturbs the normal soil microflora.
- Pesticides sprayed on crops are washed down to the soil and destroy the microbial community.
- These chemicals can cause so many human & animal diseases.
- Soil pollution can be caused so many fungal microbial disease.
- Food production & health of plant also affected by this.

Air pollution:-

Definition:-

Air pollution is the imbalance in the quality of air, so as to cause adverse effects on living organisms existing on earth.

Air pollution is the one ~~kind~~ of the most dangerous and common kinds of environmental pollution that is reported in most industrial and metropolitan cities of India & Abroad.

Causes of air pollution:-

(i) Natural Sources

i) Man-made Sources

ii) Natural Sources:-

→ Nature itself adds a few natural pollutants such as pollen grains, hydrocarbons from vegetation are air pollutants.

→ Poisonous gases like CO , O_3 , H_2S are harmful.

→ Dust storms carry fine sands for thousand kilometers.

→ Dust of desert, or storms, volcanic ash and gases are natural air pollutants.

(ii) Man-made Sources:-

→ Human population is directly effect air pollution.

→ Due to population CO_2 increases in air.

→ Industrialization affects air pollutions.

- Arsenes damage RBCs and cause jaundice.
- Air dust, smoke causes allergic, eye irritation etc.

Control of air pollution:-

a) Control of industrial pollutant:-

- For the control of gaseous pollutants, the most effective device used are combustion, absorption, adsorption, cold-trapping and condensation.
- Other wastes can be purified.

b) Control of vehicular pollution:-

- Using new proportion of gasoline and air.
- Using gas additive to improve combustion.
- Updating of engine design and/or install improved engine design.

c) Control of air pollution by rule:-

- We should avoid LPG gas for cooking and in vehicles.
- We should control use of petrol.
- We should not burn coal and other fossil related fuel.

d) Other control measures:-

- The use of CFCs should be totally banned.
- Nuclear explosion should be banned.
- Pollution control was including motor vehicles Act should be strictly enforced.

→ Pollution growth should be brought under control.

→ Trees should be planted on road sides, river banks, parks and open places. Trees keep the environment fresh and purify the atmosphere.

→ The height of chimneys should be increased to the highest possible level to reduce pollution at ground level.

WATER POLLUTION

Definition:-

"Water pollution may be defined as addition of excess of undesirable substances to water that makes it harmful".

causes of water pollution:-

Water pollution occurred by most uncontrolled rejection of waste.

(a) Domestic wastes:-

- River water polluted by human excreta rather than animals & birds.
- Detergents are causes health problems.
- Disease causing agents like bacteria, viruses and parasitic worms entered into water from domestic sewage and animal wastes.
- These water sources are the source of serious health diseases.
- Some inorganic constituents and nitrates provide nutrition to algae & These microbes are harmful to aquatic animals and plants.

(b) Industrial waste and effluents:-

- The pollution of rivers and streams by industrial waste has been a problem from the time of industrial revolution.
- The heavy metals and synthetic organic compounds produce toxic effects.

→ Mercury poisoning causes insanity & other birth diseases.

→ Plastics, metallic wastes, oils, phenols, various chemicals are industry related water pollutant.

→ Metals like mercury, zinc, copper, chromium, tin are released from paint, inks, medicine factories.

→ These can create physiological and neurological problems.

(c) Agricultural wastes:-

→ For the ever expanding world, increasing demand of food also unavoidable.

→ To enhance the production of crop, fruit and vegetable so many chemicals are putted.

→ That chemicals go to rivers, streams, lakes and pollution occurs.

→ Chemical fertilizers, organic compounds are water pollutant and unhealthy to aquatic plants and animals.

→ The medicines or chemical toxic compounds are destroyed aquatic ecosystem.

(d) Thermal pollution:-

→ Power plants and nuclear power stations are the ~~best~~ main sources of thermal pollution of water.

→ In these plants water is used for cooling & there by becomes hot.

→ These waters when released into the river or stream increases water temperature.

Control of water pollution:-

For the treatment of effluents before discharge, the following steps may be taken

(a) Primary treatment:-

→ The solid components of the sewage is removed in this way.

→ Larger solids are present in the sewage such as plastics are removed.

(b) Secondary treatment:-

→ Micro organisms are used to break down & remove the remaining dissolved wastes & fine particles.

→ In this step, generally the clear effluent received after primary treatment is treated.

(c) Tertiary treatment:-

→ This is also known as "third degree treatment".

→ It may take the form of passing the primary and secondary treated liquid phase through clean quartz tubes exposed to intense ultra violet light.

"Some other treatment to control water pollution also taken".

(d) Using Solar Power:-

→ Very recently scientists have started to use solar power purifying the polluted waste water cheaply.

→ According to them a combination of sunlight and a catalyst such as titanium dioxide can dissociate chemical toxicants of water

E) Removal of pollutants:

→ Various pollutants (radio-active, chemicals, biological material) present in water body can be removed appropriate methods such as absorption, electrolysis, ion exchange, reverse osmosis etc.

→ Reverse - osmosis is commonly used to purifying water from sewage.

NOISE POLLUTION

Definition:-

- Modern life has given rise to a new form of pollution called noise pollution or sound pollution.
- "Noise pollution can be defined as unwanted sound released into the atmosphere without any concern effects".

Noise:-

- Sound is the integral part of nature. But noise is unwanted.
- The sound without any agreeable musical quality is called noise.
- The intensity of sound is measured in decibels (dB).
- Frequency of sound expressed in Hertz (Hz).

Sources of noise pollution:-

- One decibel is the faintest sound which a human ear can hear. Sound beyond 80 decibels harms hearing system.
- 2000-5500 Hz hearing is most acute in the frequency range.
- The main source of noise pollution are the factories & industries.
- Community activities and rail road are also caused noise pollution.
- Religious celebration and family functions are also occurred in a noisy manner.

→ TV, vacuum cleaner, grinder, VCR, Radio, food mixer, fan, AC, water pumps all high musical devices are causing noise pollution.

Consequences of noise pollution:-

The different effect of noise pollution are categorised as:-

(i) Auditory Effect

(ii) Non-auditory Effect

(i) Auditory effect:-

→ These include auditory fatigue and deafness.

→ Deafness can be caused due to continuous noise exposure.

→ Temporary deafness occurs at 4000-6000 Hz permanent loss of hearing occurs at 100 DB.

→ Mumbai and Kolkata are the noisiest cities of the world.

→ Many persons have, rise of deafness in the big cities.

→ Soldiers suffer hearing loss from loud noises of tank artillery, helicopters and jet aircraft.

(ii) Non-auditory effects:-

→ Noise mainly interferes with man's communication. It prevents us from what we want to hear and enjoy.

→ Mental inefficiency is another consequence.

→ It is also injurious to the brain of pregnant women and fetus.

→ Respiratory system is highly affected by loud noise.

- Metabolism process, Circulation are badly affected.
- Noise is also found to increase cholesterol in the blood and increases blood pressure.
- Hypotension, Hypertension, annoyance, and physiological changes are occurred due to noise pollution.

Control of Sound pollution:-

- Noise at source can be reduced by designing silencing devices in air-craft engines automobile industrial machines & home appliances.
- Workers in industries should use ear plugs or they may wear ear muffs.
- Enclosures can be constructed around industrial machinery.
- The old vehicles making a lot of rattling noise should be decensored.
- Silence zone must be created near schools, colleges and hospitals.

Radiation Pollution

Radiation → Radiation is the process by which radiant energy is transferred from one place to another in the form of electromagnetic waves.

→ The radiation pollution is mainly caused by non-ionising radiation.

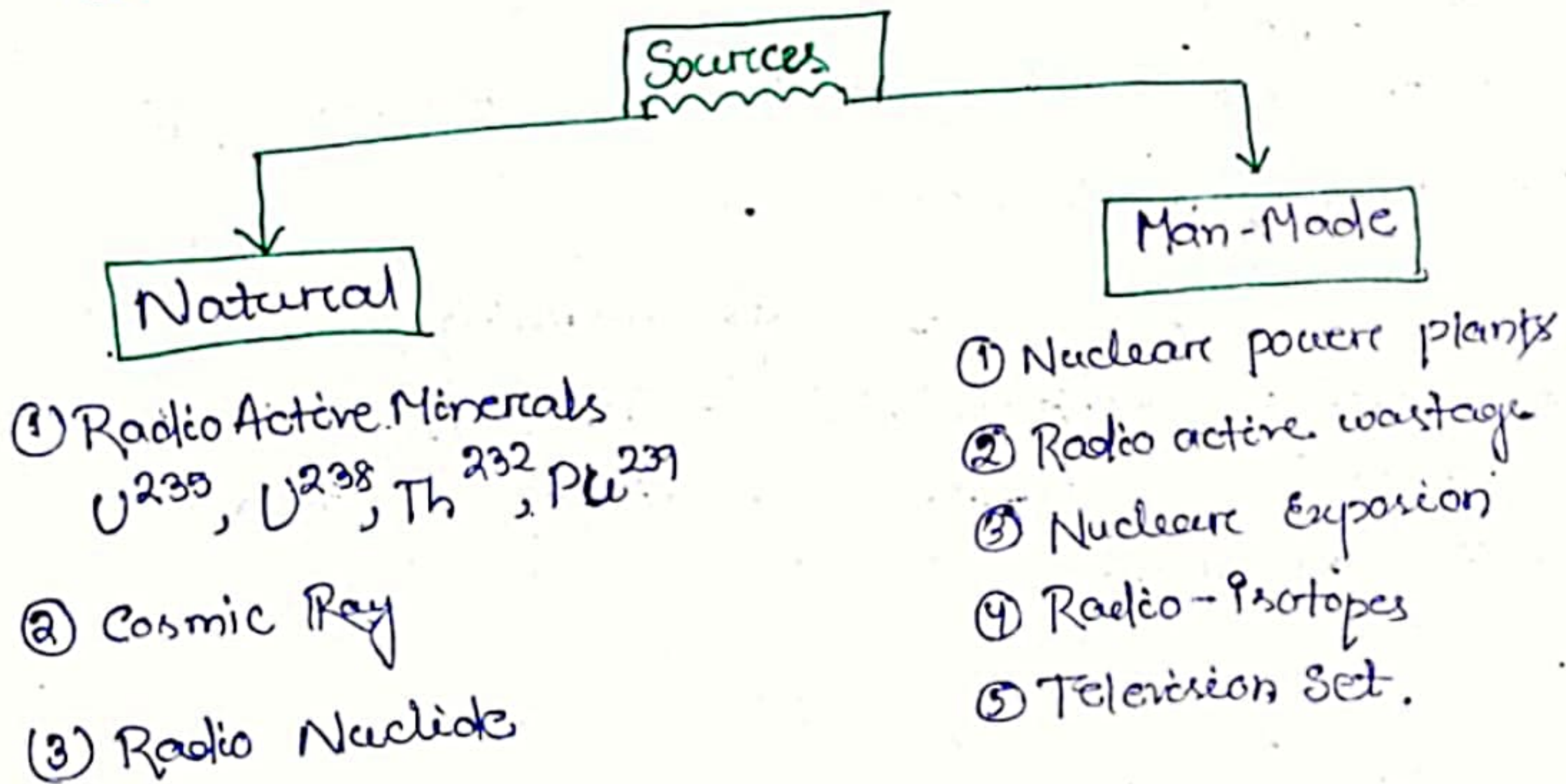
→ α , β , γ radiations are mainly responsible for radiation pollution.

→ α - contains +ve charges

→ β - contains -ve charges

→ γ - made up of high energy photons.

Photons bring about strong electro-magnetic interaction with matter.



Effect of Radiation Pollution :-

→ Free radical causes mutation by breaking DNA.

→ Radiation in bone marrow may cause leukemia.

→ Radiation may cause skin tumors which may lead to skin cancer

→ Radiation at pelvic regions of pregnant ladies, cause damage to the fetus.

Control of Radiation Pollution

1. Care should be taken to check manmade radiation pollution at source.
2. Nuclear reactors should be perfectly maintained to avoid accidental leakage.
3. Nuclear tests should be banned.

GREEN-HOUSE EFFECT & GLOBAL WARMING

- Worldwide industrial development, growth in world's population and an ever increasing demand for energy has given rise to a host of environmental problems, which are global in nature.
- It is becoming increasingly clear that a no. of environmental issues have assumed global dimensions.
- CO_2 has a concentration of about 0.03% in atmosphere.
- The concentration is increasing continuously due to the burning of fossil fuels with increasing use of vehicles.

Green House Effect

- The green-house effect is a natural process in which certain gases, known as "greenhouse gases", trap heat that radiates from the earth's surface.
- In fact, a greenhouse is a construction of transparent walls and roofs in cold countries to provide adequate heat to the soil & plants.
- The solar heat/energy penetrates the greenhouse but is prevented from escaping, and thus heat remains within the greenhouse, keeping it warm.

→ It is a naturally occurring phenomenon wherein certain atmospheric gases, such as water vapour & CO_2 , regulate the radiant energy balance of Earth, thus making it habitable.

→ The term 'greenhouse effect' was first used in 1827 by J. Fourier.

Importance of greenhouse effect :-

→ If there were no greenhouse effect and the atmosphere was transparent to the outgoing long wavelength radiation emanating from the earth's surface, the mean equilibrium tempⁿ of the earth's surface would have been considerably lower and probably below the freezing point of water.

→ According to one estimate, in the absence of greenhouse gases, earth's average global tempⁿ would have been -18°C (-4°F) rather than its current temperature.

→ Thus, the greenhouse gases act as a thermal blanket surrounding the earth.

Causes of Greenhouse effect.

→ Through there are lots of greenhouse gases, CO_2 is a worse offender than any of the others.

→ This is mainly because of its sheer quantities which human activities generate through burning of fossil fuels.

→ Scientists recognise five important greenhouse gases mainly CO_2 , CFC, NO , CH_4 .

→ Beside these, ozone is also considered a greenhouse gas.

Sources of greenhouse gases:-

Greenhouse gases are ~~real~~ released in the atmosphere in various ways. For example:

→ Electric power stations, based on fossil fuels, mainly coal & mineral oil, emit huge amounts of N_2O which reach the atmosphere.

→ Numerous factories spread all over the world, burn immense quantity of coal, mineral oil & natural gas and spew huge amount of CO_2 together with other undesirable gases through their chimneys into the atmosphere.

→ The third major source is the transport sector which includes various types of vehicles, run on coal & petroleum.

→ The fourth major source of production of CO_2 is deforestation & burning of firewood.

→ Amount of CFCs in the atmosphere is small but they are 10,000 times more effective than CO_2 in trapping heat.

Impact of greenhouse effect:-

→ Gradual increase in the temperature of the earth's surface. The tempⁿ on earth may increase by about 1.5°C - 4.5°C by the year 2050.

→ Photosynthesis, water use efficiency & yield of plants would decrease.

→ Human health would also be affected.

→ People will face food scarcity, Bore of storage of agricultural crops.

GLOBAL WARMING

- Virtually all scientists agree that if "greenhouse gases increase" & all other factors remain the same, the earth will warm up.
- Climate is the most important environmental variable of planet earth.
- The ways in which climatic forces interact are poorly understood & it is possible that some other factors enhance it.
- According to recent reports, the climate is getting warmer & the effects of global warming are becoming increasingly noticeable in countries such as UK which are known to have a cold climate.
- Warning against compelling evidences of a shift in the Earth's weather patterns & change in climate, the World Wide Fund for Nature has released the 'State of the Climate Report' (1997) compiling a huge array of global data which clearly signal that a change is already under way.
- Climate change is affecting every region and most nations; 1995 was the hottest year in the history & 1997 came a close second.
- The temperature of Earth's surface varies appreciably from place to place.
- However the surface temperature, is averaged globally, differs from year to year by only fractions of a degree.

→ The world is experiencing the biggest thaw since the last Ice age.

→ The primary effect of global warming is rising sea-level will be increased coastal flooding, ~~from~~ storm surges and wave activity.

→ climate change ~~can~~ could lead to the extinction of many animals including migratory birds, Global warming has already changed the migration routes of some birds & can have dramatic impact on wildlife, ~~with~~ wildlife with rapid depletion of the tiny plankton organisms which form the food web in the oceans.

→ This is thought to have contributed to a recent drastic decline in the breeding rates of some seabirds, as the fish on which they depend were suddenly deprived of food.

Ozone Layer Depletion

What is Ozone?

Ozone is a colourless gas which is found in the stratosphere of the upper atmosphere.

What is Ozone layer?

The layer of ozone gas is what which protects us from the harmful UV rays of the sun.

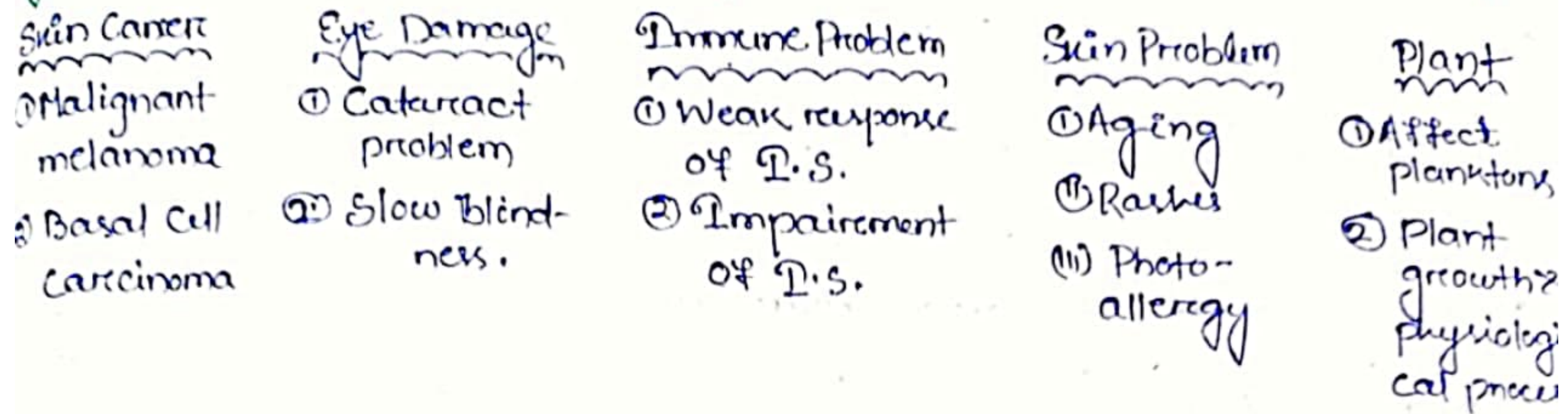
- It is one of the prime cause of global warming.
- From the 1970s the depletion of the ozone layer started to the attain of the scientists, environmentalists and world community at large.

Causes of Ozone layer Depletion:-

- The production & emission of CFCs causes 80% of total O_3 depletion.
- Chlorine & Bromine gas is increasing in upper stratosphere which causes O_3 depletion.
- HCFC (Hydro Chloro Fluorocarbons) and Volatile Organic Compounds (VOCs) are found in vehicular emissions, by-product of

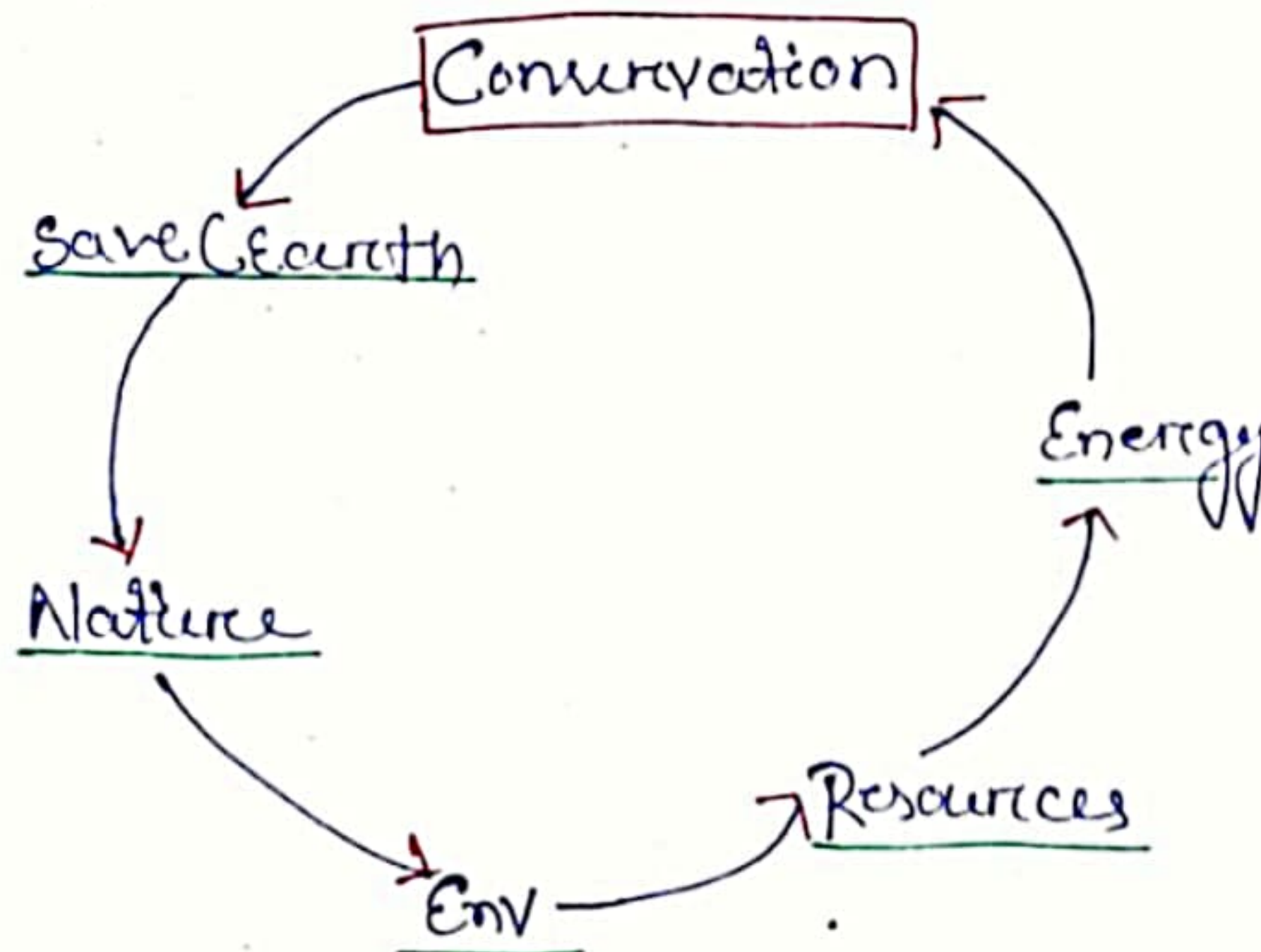
Industrial ~~waste~~ process, aerosols and refrigerants.

Effects of O_3 depletion



Conservation of Environment :-

- Environmental conservation is a practice of protecting the natural environment on individual, organizational or gov level for the benefit of both the natural environment & humans.
- It is the wise management and utilization of natural renewable resources in a sustainable manner to ensure the maintenance of biodiversity.



Importance of Environmental Conservation

- Avoid Exploitation of natural resources
- To keep Balance in our ecosystem.
- To prevent Human caused natural disasters.
- To Reduce the impact of global warming.
- Bring awareness.

Preservation of Environment

- Minimize the use of ground water, non-renewable energy resources. Practice using renewable resources.
- Don't use chemical pesticides & go organic.
- Save forest and plant/trees (Because these are lungs of our earth).
- So many environmental acts are there and those should come into force.
- Reuse and recycle technique is important.
- Protect fauna & flora.
- Reduce consumption and start preservation.

Environmental Regeneration

Regeneration is actually a process of forming again renewing and reconstructing.

Why should we regenerate the Environment?

- ① Oxygen for us to breathe
- ② Sustainable food production
- ③ Healthier food
- ④ Reduced poverty, starvation & disease in developing countries
- ⑤ Reduced drought & water shortage
- ⑥ Reduced landslides, flash floods, etc.
- ⑦ Reduced environmental toxins.

Industrialization

- The development of industries in a country or regions on a wide scale
- The process by which an economy is transformed from a primary agricultural one to one based on the manufacturing goods.

Positive Impact of Industrialization

- ① Low cost of production
- ② Self-sufficient
- ③ Employment
- ④ Improved Agriculture
- ⑤ Defence & Security

Negative Impact of Industrialization

- ① Decline of cottage Industry
- ② Mass migration of rural areas
- ③ Depletion of natural resources
- ④ Pollution
- ⑤ Increase of War-like Situation

MINING

Mining is the process of extracting useful materials from the earth.

Ex:- Coal, petroleum, iron ore etc.

- The environmental impact of mining includes erosion, formation of sinkholes, loss of biodiversity & contamination of soil, groundwater and surface water.
- Mining of minerals, being an environmentally unfriendly activity.
- Mining affects all the components of environment i.e air, water, soil, plant etc.

Impact of Mining on Society :-

- ① Displacement of people.
- ② Loss of livelihood.
- ③ Change in population dynamics.
- ④ Humans are also affected by mining.

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- 3.0 Environmental Management and Protection
 - 3.1.1 The concept of environmental management
 - 3.1.2 Scope of environmental management
 - 3.1.3 Need for environmental management
 - 3.1.4 Functions and characteristics of environmental management
- 3.2 Dimensions of environmental management. Factors responsible for flora and fauna extinction
 - 3.2.1 Dimensions of environmental management
 - 3.2.2 Factors responsible for flora and fauna extinction
- 3.3 Measures to conserve flora and fauna – causes for forest fire-measures of prevention
 - 3.3.1 The need of conservation of flora and fauna
 - 3.3.2 Causes for forest fire-measures of prevention
 - 3.3.3 Prevention and control measures for forest fires in India

- 3.4 Major environmental problems in India – Environmental protection and policies in India
 - 3.4.1 Major environmental problems
 - 3.4.2 Environmental protection and policies in India
- 3.5 Need and objectives of conservation – Environmental conservation measures
 - 3.5.1 Environmental conservation measures taken in India
 - 3.5.2 Waste management
 - 3.5.3 Alternative sources of energy
 - 3.5.4 Organic farming
 - 3.5.5 Rainwater harvesting
 - 3.5.5.1 Surface runoff harvesting
 - 3.5.5.2 Roof Top Rainwater Harvesting
 - 3.5.6 Rainwater harvesting techniques
 - 3.5.7 Community participation in nature resource management, water and forests
- .6 Constitutional amendments made and Environmental laws

UNIT-3

ENVIRONMENTAL MANAGEMENT AND PROTECTION

Environmental Management :-

Environmental management is an attempt to control human impact on and interaction with the environment in order to save water, energy, natural resources and reduce -ve environmental impact.

Environmental Protection :-

Environmental protection is a practice of protecting the natural environment on individual, organization controlled or governmental levels, for the benefit of both the environment and humans.

The broader objectives of environmental management include:

- (i) To identify the environmental problem and to find its solution.
- (ii) To restrict and regulate the exploitation and utilization of natural resources.
- (iii) To regenerate degraded environment and to renew natural resources (renewable)
- (iv) To control environmental pollution and gradation.
- (v) To reduce the impacts of extreme events and natural disaster.
- (vi) To make optimum utilization of natural resources.
- (vii) To assess the impacts of proposed projects and activities on environment.
- (viii) To review and revise the existing technologies and make them ecofriendly.
- (ix) To formulate laws for the implementation of environmental protection and conservation programmes.

Environmental Management Consists of 3 Levels

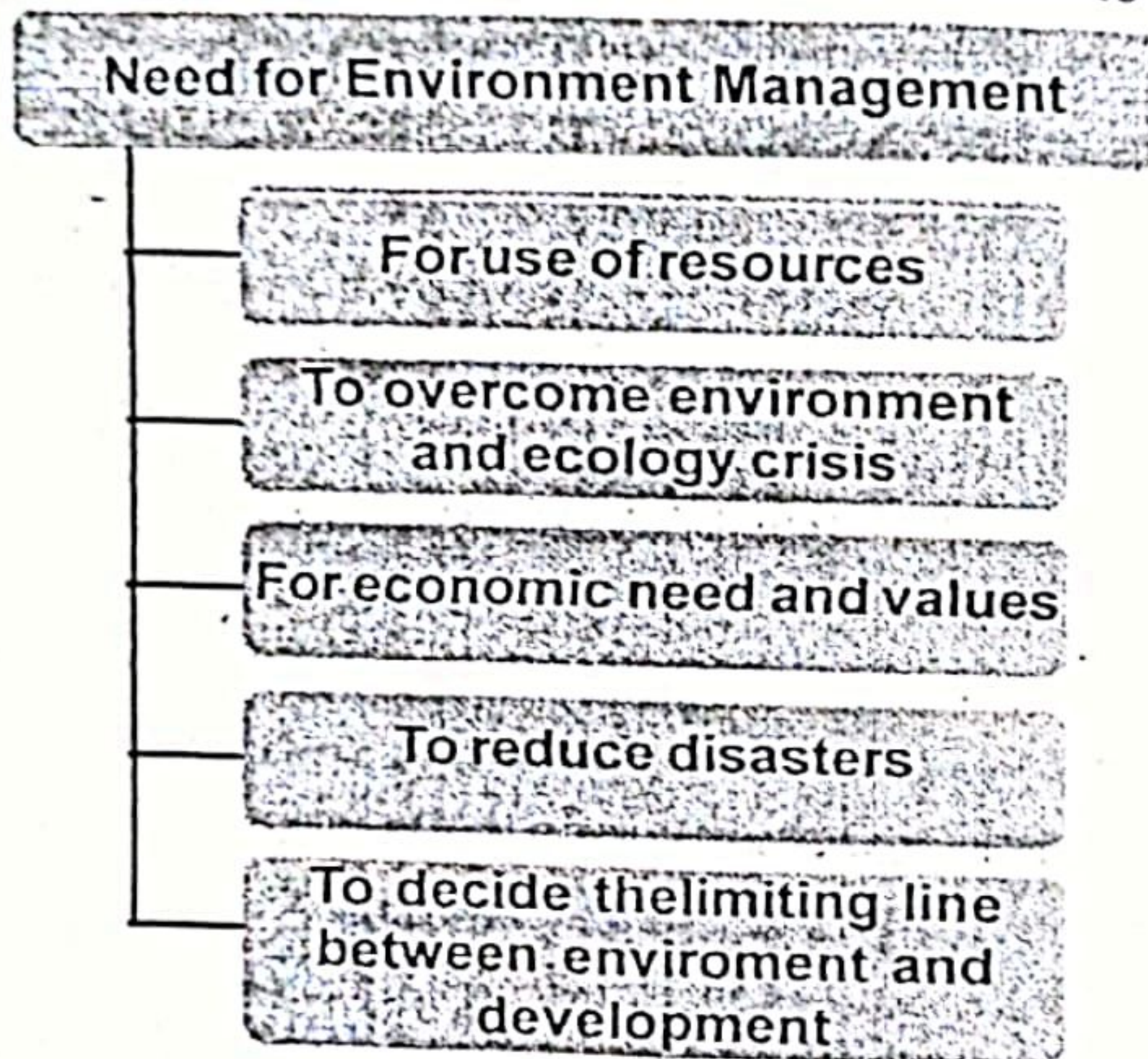
- ① Global Level (O₃ depletion, Green House effect, Global warming)
- ② National Level (Deforestation, Pollution, wild life depletion)
- ③ Local Level (Industrial waste, agricultural / domestic waste)

Scope of Environmental Management

- ① Env. Perception & public awareness
- ② Env. Education & training
- ③ ~~Resource~~ Control of Env degradation & pollution.
- ④ Resource management
- ⑤ Environmental Impact assessment.

3.1.3 NEED FOR ENVIRONMENTAL MANAGEMENT

Need to study environmental management is an important perspective in the current scenario. Environmental stress is becoming severe day by day. Degradation of environment poses a serious threat to humanity.

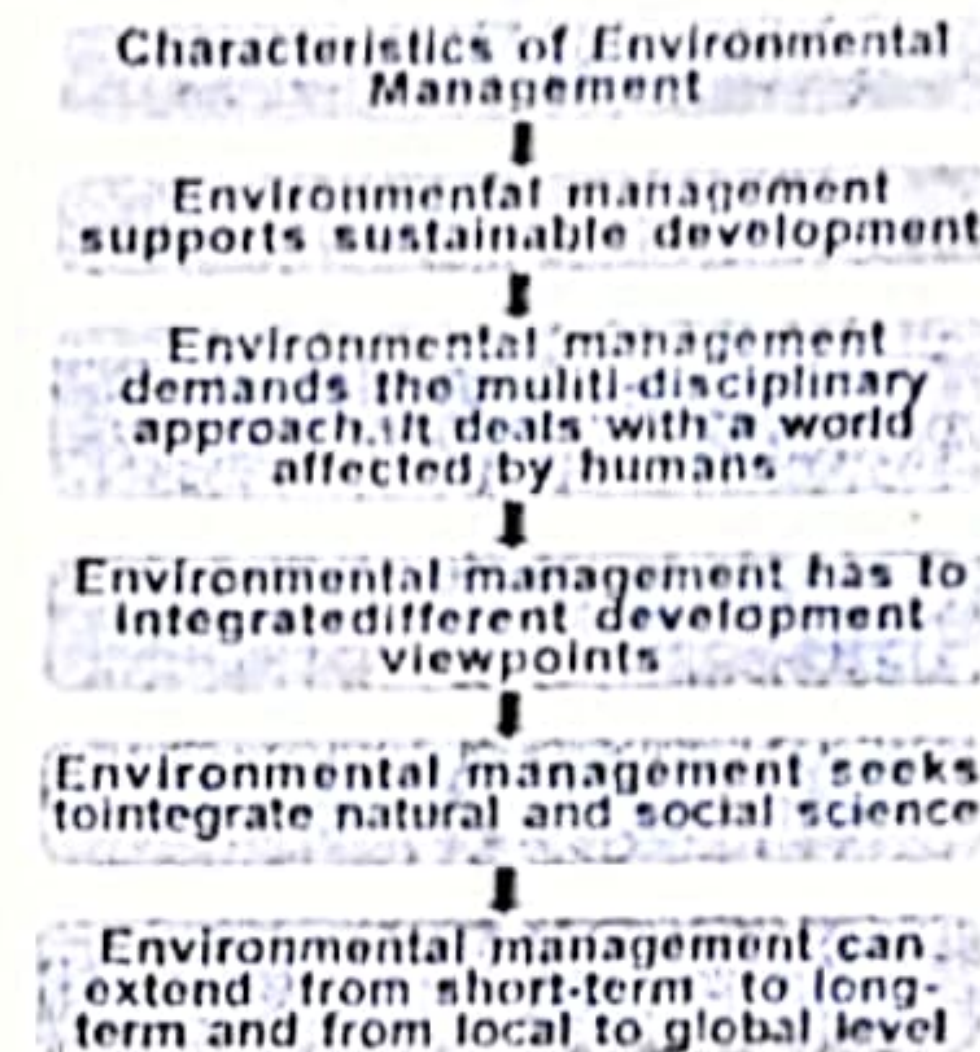


Need to study environmental management is depicted in the above image.

1. For use of resources
2. To overcome environment and ecology crisis
3. For sustainable development
4. For economic need and values
5. To reduce disasters
6. To decide the limiting line between environment and development

- ❖ Environmental planning, education and guidance
- ❖ Monitoring, analyzing and reporting on the environment
- ❖ Regulating world's greenhouse gas emissions
- ❖ Environmental research development
- ❖ Strategic environmental assessment
- ❖ Waste management
- ❖ Radiological protection

Characteristics of environmental management:



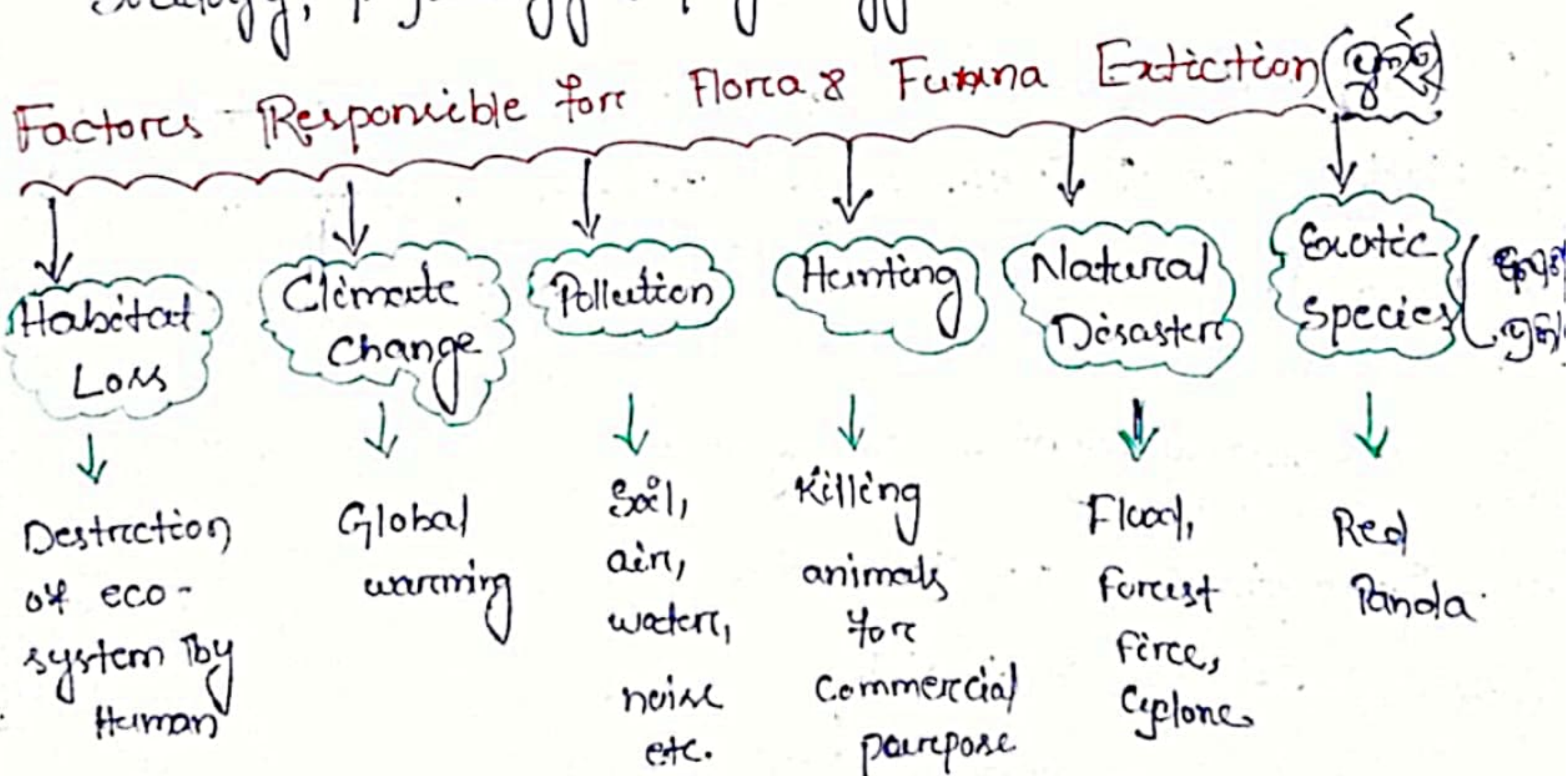
3.1.4 FUNCTIONS AND CHARACTERISTICS OF ENVIRONMENTAL MANAGEMENT

We have a wide range of functions in environmental management, and our primary responsibilities include:

- ❖ Environmental licensing
- ❖ Enforcement of environmental law

Dimensions of Environmental Management

- The environment determines the nature of people, animals, plants and places around the earth, affecting behaviour, religion, culture, and economic practice.
- Environmental management can be viewed from a variety of perspective.
 - The biophysical environment
 - Biotic & abiotic component
 - Relationships among all living species & their habitat.
- The essential aspects of environmental management are ethical, economical, social & technological.
- Environmental management covers many areas in science including geography, ~~biogeography~~, Biology, Physics, Chemistry, Sociology, psychology & physiology.



Global Effects of the Destruction of Flora & Fauna

→ The Amazon rainforest once gave us 20% of our O_2 supply. As their destruction has progressed, so has the incidence of respiratory illness around the world.

→ The destruction of trees will affect our daily lives.

→ Birds and animals help in spreading seeds inside the forest, their destruction may minimize the cause of propagation of many plant species & they will disappear.

→ "Acid rain" is also man made, which is destroying the environment.

Precaution What can be done?

We Should Stop :-

- ① Prevent destruction of indigenous flora & fauna & their eco-system as well.
- ② Clear-cutting & killing of expensive trees.
- ③ Killing of animals & birds for benefit.
- ④ Inhuman activities which causing habitat destruction & degradation. (Urban Expansion)

What Should Do :-

- (i) Join world wild life fund.
- (ii) Support & protect the fauna & flora to support world's ecological system.
- (iii) Spread awareness.
- (iv) Run Campaigns.

Global Warming:-

Increase in the average temperature of Earth.

* Avg temp of Earth increased by 1 degree in last century.

Pollution:-

Pollution is defined as an unwanted change in the environment.

* It can be natural or manmade.

* Ex:- air, water, soil pollution.

Hunting & Trade:-

Humans have hunted numerous animal species to extinction, hunting continues to be a major threat to some species.

* The major cause behind animal hunting is commercial benefit.

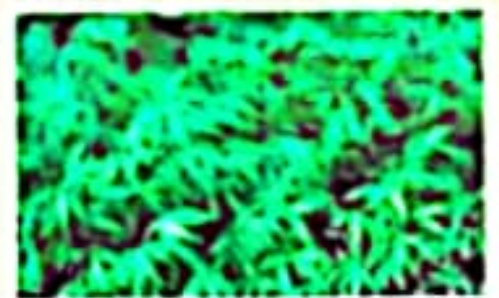
Invasive Species:-

An invasive species is an organism that is not indigenous, or native, to a particular area.

* Invasive species can cause great economic & environmental harm to the new area.



• A non-native species that adversely affects habitats and biodiversity.



The need of Conservation of Flora & Fauna



FLORA

Flora is the plant life occurring in a particular region or time.



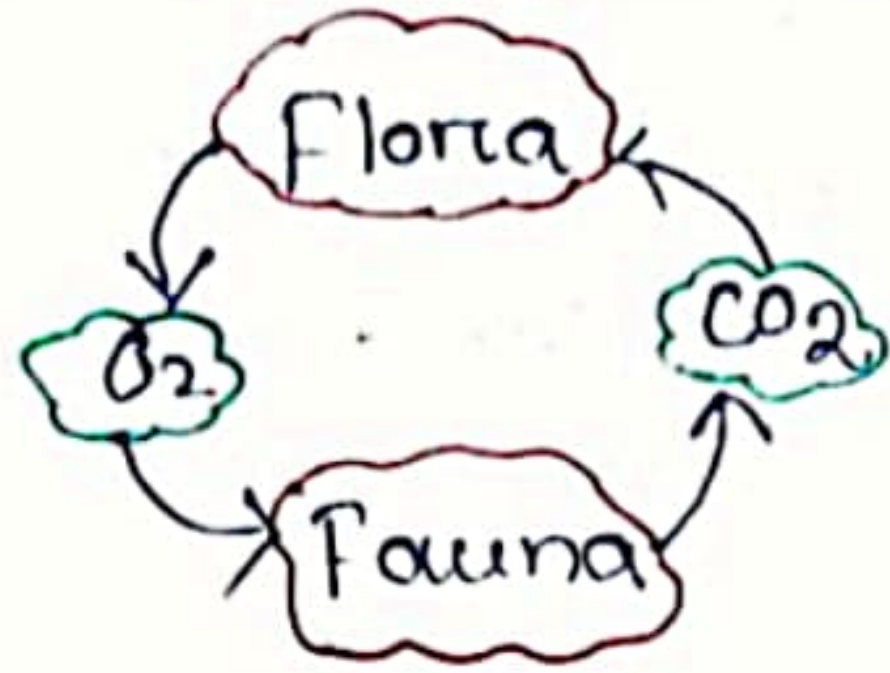
FAUNA

Fauna is all of the animal life of any particular region or time.

Biodiversity:- Biodiversity refers to the diverse kind of living things in a given area.

The need of conservation of Flora & Fauna

① Maintenance of Ecological Balance.



② Aesthetic Value

→ This gives the whole spread aesthetic value of the Earth.
→ People visit forest reserves, zoo, Botanical gardens to enjoy beauty.

③ Expansion of Local Economies

→ This contributes Local Economies through tourism
Ex:- Semilipal (Odisha)

④ Flora & Fauna of India

Fauna

The popular Fauna of India

Include:-

1. 500 diff. varieties of mammals
2. 2000 " species of Birds.
3. 30,000 types of insects.
4. Several fishes, amphibians & reptiles.

Flora

The popular Flora of India
Include.

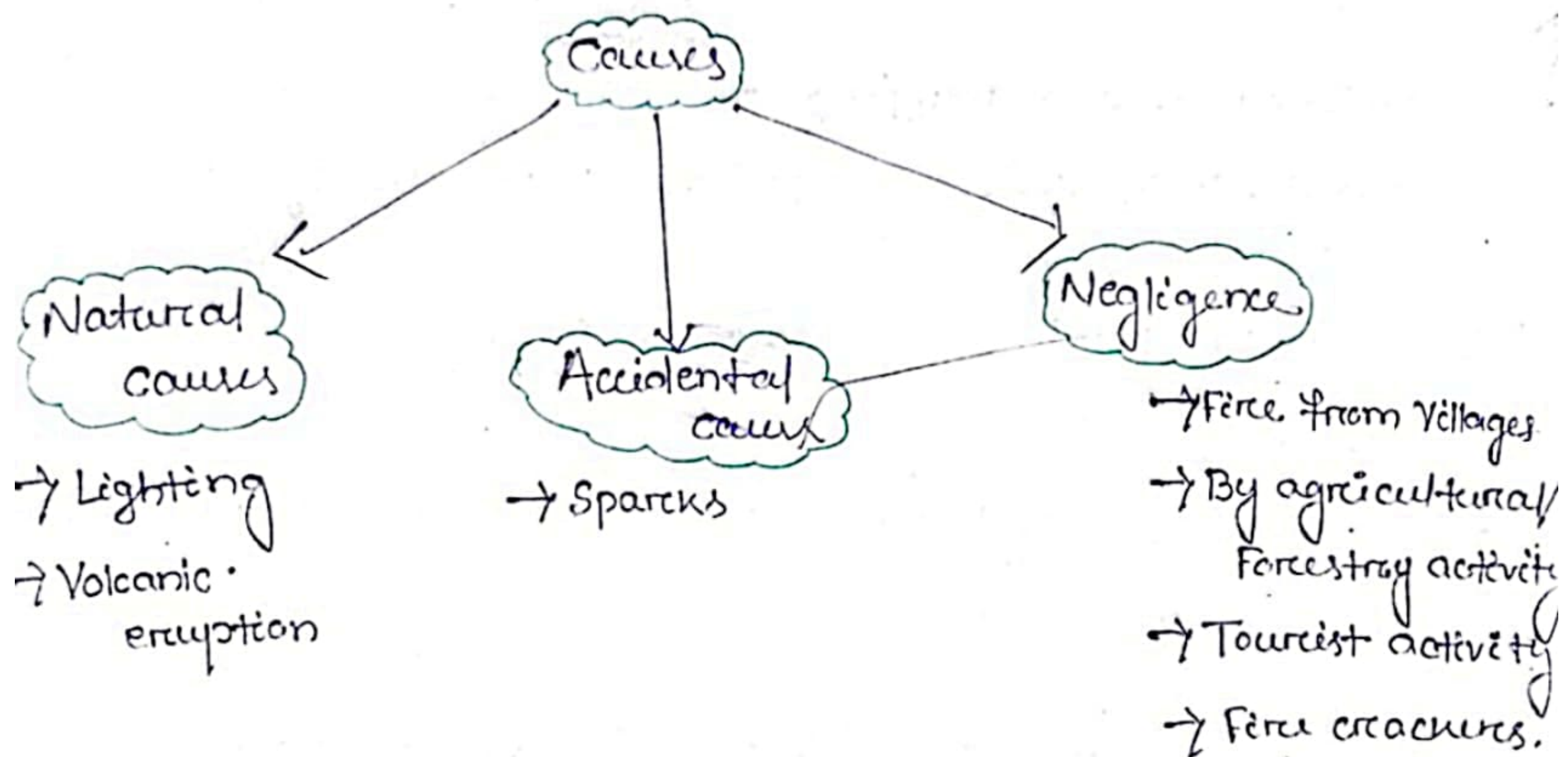
1. Alpines, pines,
2. Temperate Forest
3. Deciduous Forest
4. Evergreen Forest.
5. Oaks
6. Bamboo & tall grass etc.

The Steps taken By Govt. for conservation

- ① Article - 48 of the Constitution of India specifies that "the state shall endeavor to protect and improve the environment and to safeguard the forest & wildlife of the country."
- ② Article - 51(A) :- States that "It shall be the duty of every citizen of India to protect & improve the natural environment including forests, lakes, rivers & wildlife and to have compassion for living creatures."
- ③ CAFE (The conservation of Arctic Flora & Fauna) project launched to protect and promote sustainability of the Arctic's living resources.
- ④ Wildlife Protection Act of 1972 & Forest conservation Act 1980.
- ⑤ Biological Diversity Act 2002.

Causes For Forest Fire - Measures of Prevention

An uncontrolled fire often occurring in wild ~~to~~ land areas, but which can also consume houses or agricultural resources is called forest fire or wildfire.



There are two types of Forest Fire.

Surface Fire

Burning of dry grass, leaves & twigs on forest floor.

Crown Fire

Burning of crown or top part of the trees.

Impacts of Forest fires:-

- Loss of Biodiversity, extinction of plant and animals.
- Global warming.
- climate change.
- Degradation of Environmental Phenomena.

→ Loss of Natural regeneration.

→ Loss of valuable timber.

→ Ozone layer depletion.

→ Human health problems.

Prevention and control, measures for Forest fires in India

→ Identification and mapping of all fire-prone areas.

→ Compilation & analysis of database on the damage due to forest fire.

→ Installation of Fire-Forecasting System.

→ Public awareness.

→ Preventive measures should be taken before summer.

→ Keep the fire causing sources away.

* A pilot project was launched in U.P and Maharashtra, where severe fires had damaged about 50% of the forest area.

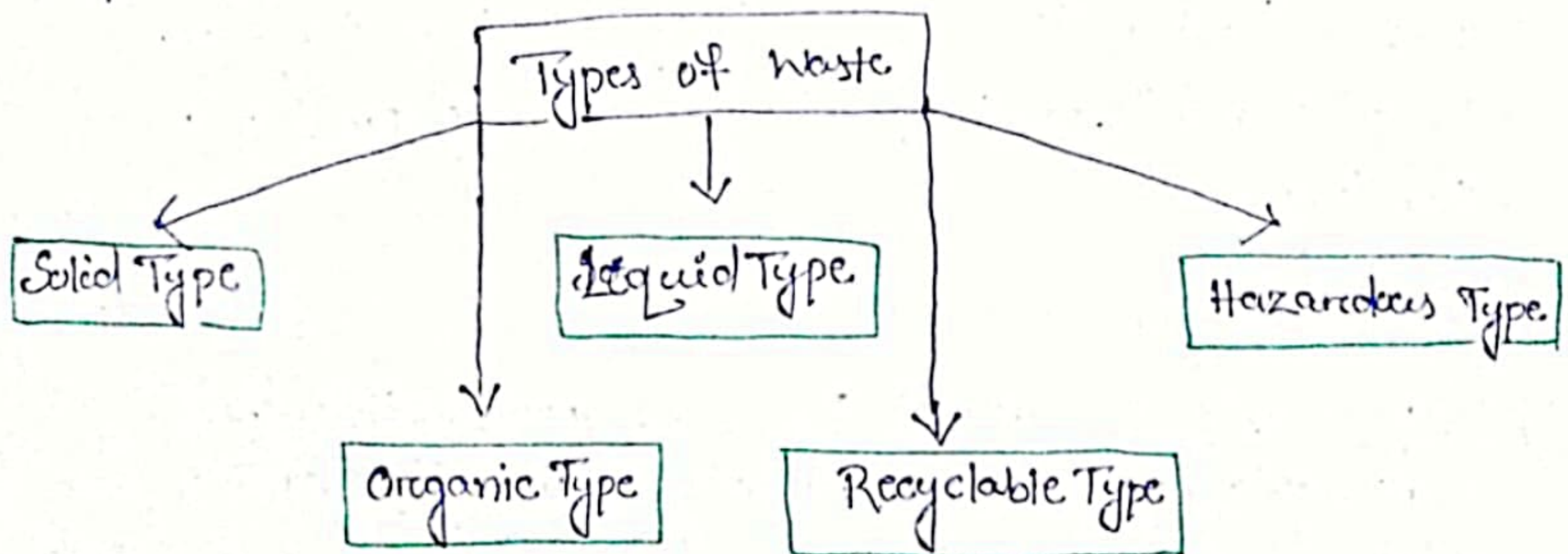
• The Haldwani & Chandanpur forest fire incidents were reduced up to 90% through the pilot project.

Major Environmental Problems in India

- ① Growing population
- ② Poverty (40%)
- ③ Agricultural Growth.
- ④ Need to ground water
- ⑤ Development & Forest
- ⑥ Degradation of Land
- ⑦ Reorientation of Institutions.
- ⑧ Reduction of Genetic Diversity
- ⑨ Consequences of Urbanization
- ⑩ Air & water Pollution.

Waste Management

- Waste cause pollution on land, water & air. Proper management of waste is important to reduce pollution.
- The amount of wastes increase due to the high population. More the people, more the waste.
- The term "waste management" means collectively means the management of waste from its inception to the final stage of disposal.



Methods of Waste Disposal

① Land Fill :-

- Modern landfills are well-engineered and managed facilities for the disposal of solid waste.
- A system of trash and garbage disposal in which the waste is buried between layers of earth.

② Incineration / Combustion :-

- Combustion is the controlled burning of substances in an enclosed area, as a means of treating and disposing solid and hazardous waste.

③ Recovery & Recycling :-

- Recovery is the process of taking useful discarded items for a specific next use.
- Recycling is the process of converting waste products into new products to prevent energy usage.

④ Plasma gasification :-

Plasma gasification - waste treatment technology that uses a combination of electricity and high temperature to turn municipal waste into usable by-products without burning.

⑤ Composting :-

- Composting is a natural biological process that turns decomposable materials into organic nutrient rich substance for plant growth.

→ In this process, various micro-organisms including bacterial, fungi break down organic matter into simpler substance.

Advantages of Waste management :-

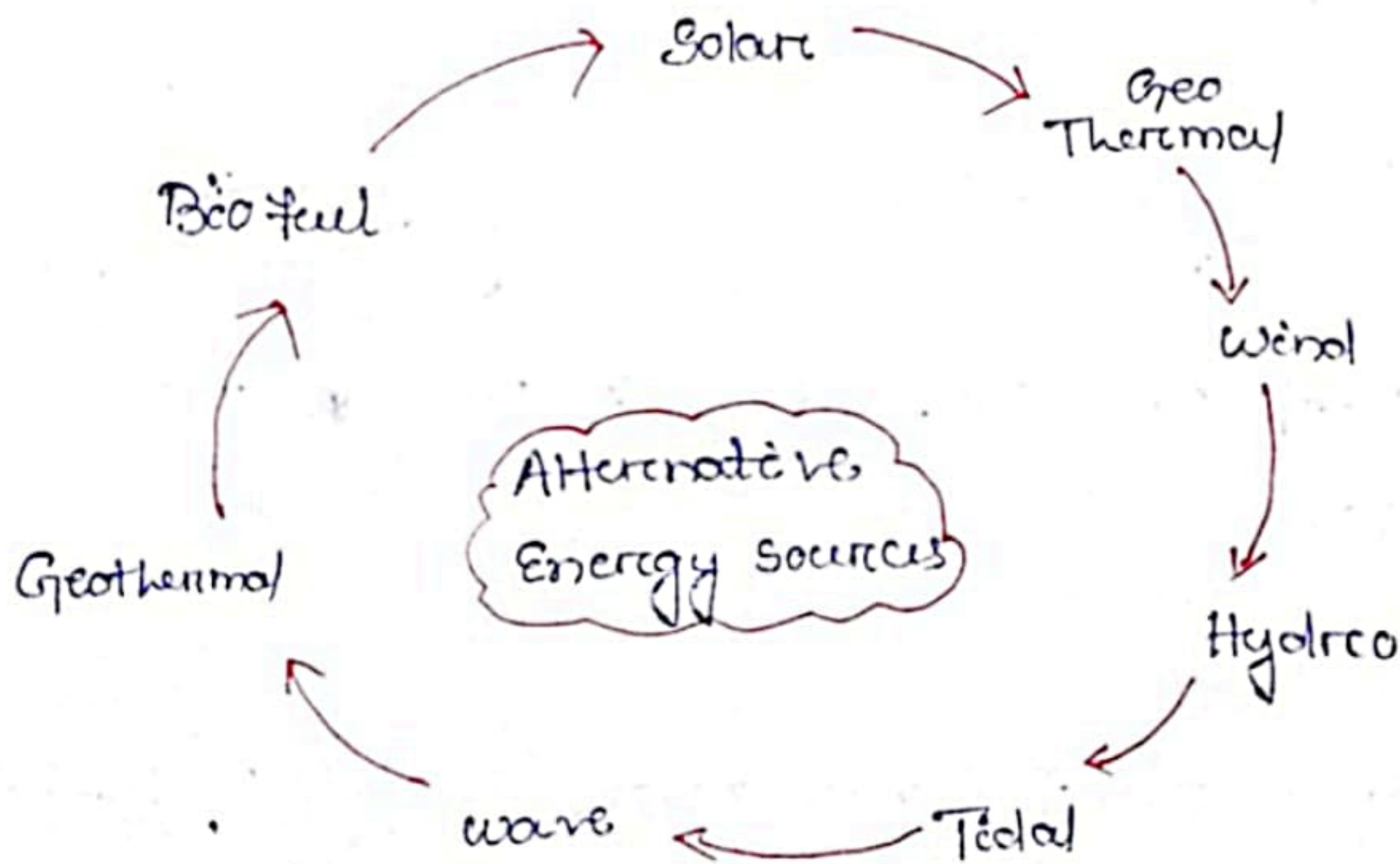
- Reduce environmental pollution.
- Keeps the environment clean & fresh.
- Saves the Earth & conserve energy.
- Create employment.

Dis-advantages of Waste Management

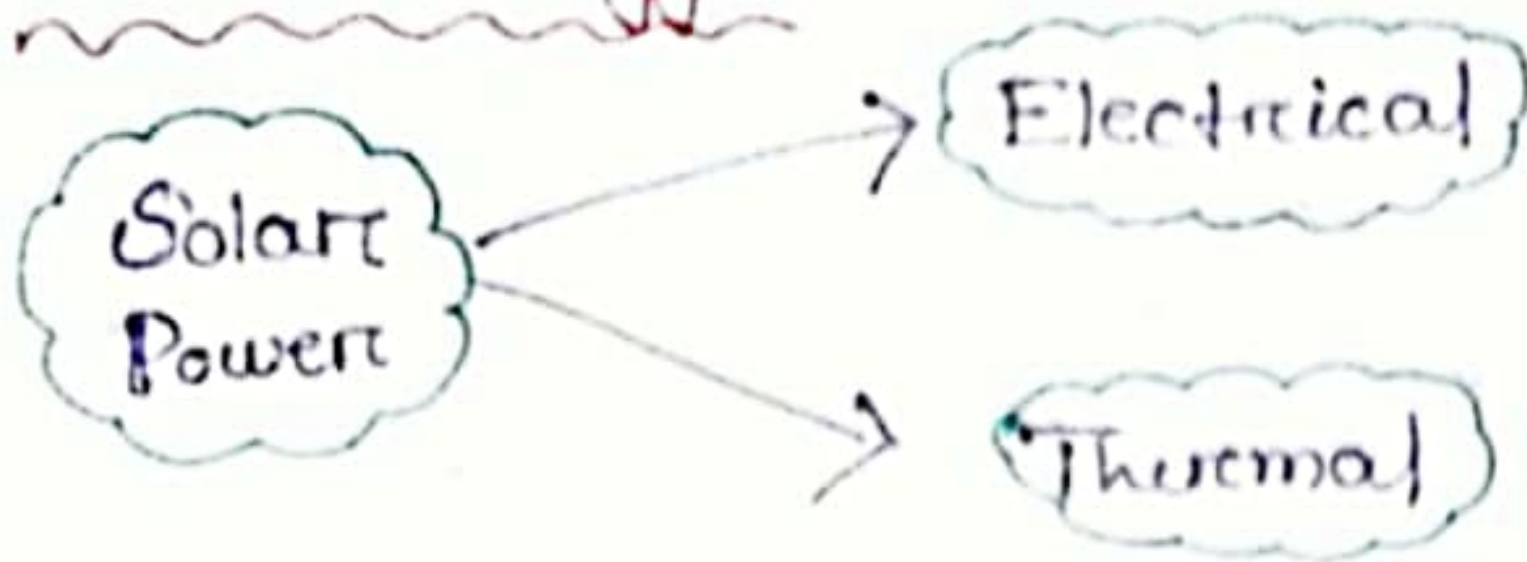
- The process is not always cost effective.
- The result product has a short life.
- The site are often dangerous.
- The practices are not done uniformly.

Alternative Sources Of Energy

"Alternative energy is any energy source that is an alternative to fossil fuel."



① Solar Energy :-



- Solar Heat has long been employed in passively and actively heated buildings, as well as district heating systems.
- Currently, Photovoltaic (PV) panels only have the ability to convert around 16% of the sunlight that hits them into electricity.
- Solar energy is renewable and releases no water / no air pollution.
- The only 50% of energy received by a solar panel can be converted into electricity.
- Solar thermal (heat) energy is a carbon free, renewable alternative to the power we generate with fossil fuels like coal and gas.

② Wind Energy :-

- Wind energy is the generation of electricity from the wind.
- Wind power plants have been set up in locations where the wind velocity is high.

③ Geothermal Energy :-

- 'Geo' means 'Earth' and 'Thermal' means 'Energy'. Geothermal energy means energy drawn from beneath the Earth.
- Geothermal energy can be found anywhere on the Earth. Most countries tap this energy generate to electricity.

④ Hydroelectric Energy

- Hydro-electric power comes from the potential energy of dammed water driving a water turbine and generator.
- Hydro electric power stations capture the kinetic energy of moving water & give mechanical energy to turbine.
- Then the moving turbine convert mechanical energy to electrical energy through generators.

⑤ Biomass Energy :-

This is the process by which an alternative energy is generated through conversion of biological materials & wastes into forms that can be used as energy sources for heating, power generation and transportation.

⑥ Ocean Energy :-

- There are 3 ways i.e. Tidal Energy, Wave Energy & Ocean thermal energy conversion (OTEC) via which ocean energy can be drawn.
- Tidal power basically involves using kinetic energy from the incoming & outgoing tides.
- The rise & fall of ocean tides are captured by tidal energy generators which turn turbines.
- It is another form to produce hydropower.

UNIT-4

ENVIRONMENTAL MOVEMENT & DEVELOPMENT

Silent Valley Movement

This ^{was} a movement against the government to protect Silent valley, an evergreen tropical rainforest in the Palakkad district of Kerala, India.

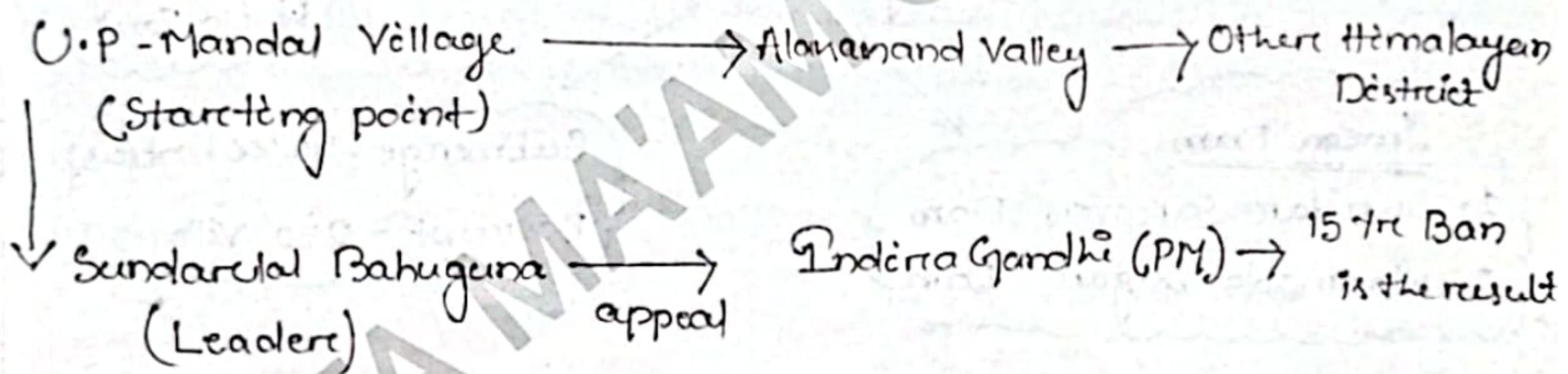
- It was started in 1973 to save the Silent valley Reserve Forest from being flooded by a hydroelectric project.
- In 1958, a study and survey of the area were conducted and a hydroelectric project was proposed by Kerala State Electric Board (KSEB).
- The plans for a hydroelectric project that threatened the park's high diversity of wildlife stimulated an Environmentalist social movement on the motive to "save Silent Vally" which resulted in the cancellation of the project.
- The valley occupying an area of 8950 hectares.
- In ¹⁹⁸⁵ ~~1982~~ it was declared as a National Park by the PM Rajiv Gandhi.
- This biologically fragile area storing rich stock of biodiversity has been declared as Biosphere reserve & now is under category of "HOT SPOT".

Chipko Movement

- Chipko movement is also called as "Chipko andolan", this is a non-violent social and ecological movement by rural villagers, particularly women.
- It is the first organised movement started in April 1972 in support to protect the trees against the commercial forest policy.

History - Though this Chipko Movement gained popularity in 1970s, But the real movement occurred in 1604, when a large number of villagers (from Bishnoi Community), Rajasthan embraced the trees in a forest (near Khejri Village, close to Jodhpur) and prevented the King's soldiers from cutting them down. The angered Jodhpur King ordered the soldiers to kill the Bishnois, while cutting down the trees as a result around 363 people died by trying to protect Khejri trees (God of desert). That event has been recorded in Indian history as Chipko movement.

Chipko Movement



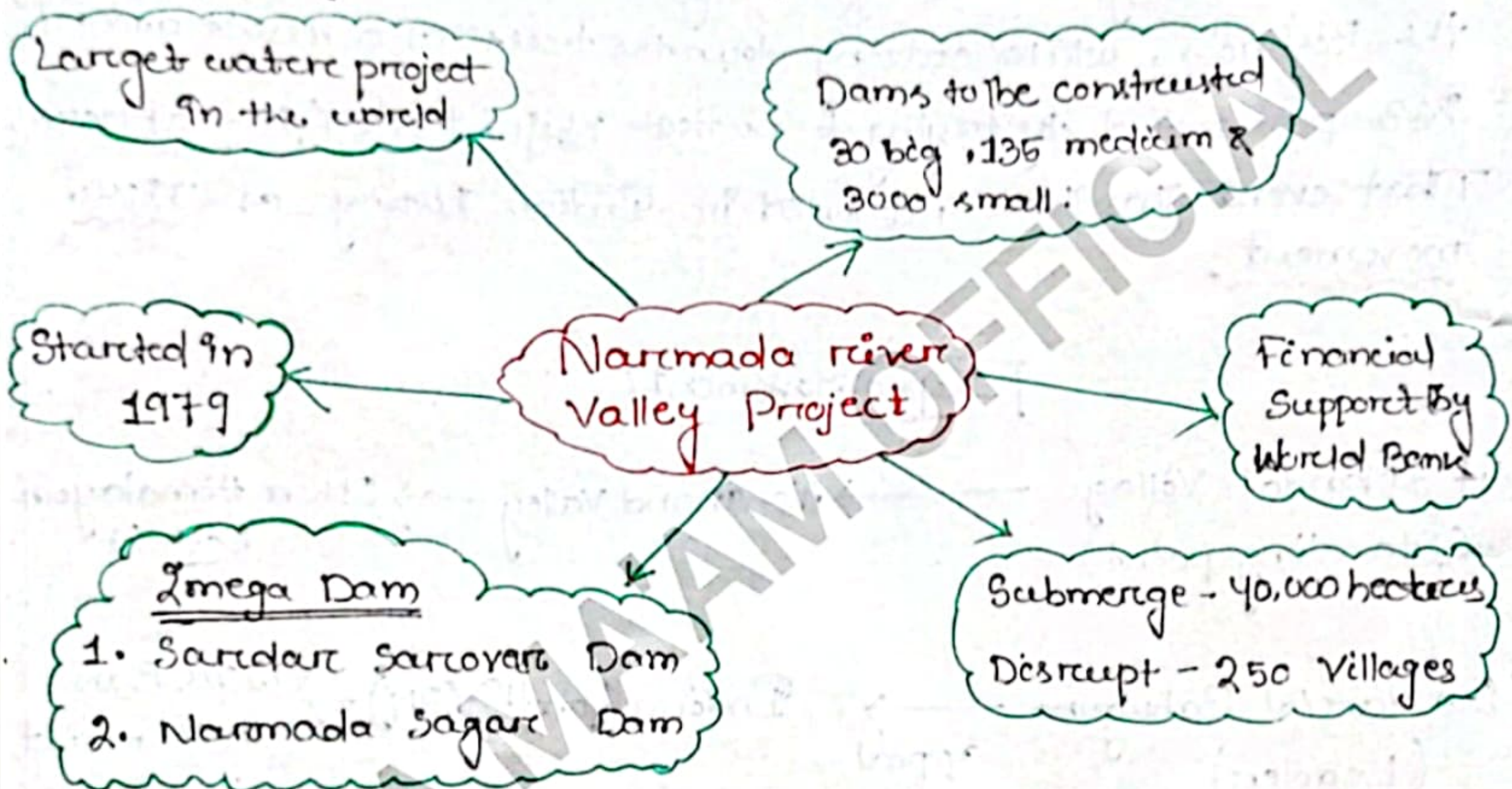
Benefits

- The government rethink the priorities & include the local people in forest management.
- The local people could continue depending on the forest for meeting their basic needs.
- The major impact, prompted the Union government to amend the Indian Forest Act 1927, and introduced the Forest conservation act 1980.

Narmada Bachao Andolan

Narmada River

- This is considered to be a sacred by the Hindus.
- This is one of the largest westward-flowing rivers of India & covers 94,500 km. (Vindhyas - Satpuras)
- The Valley contains rich deposits of alluvial soils.



The Movement

- This may cause major economical & ecological damage.
- No, proper resettlement plans were made for the people.
- So the protest started & mobilized in the mid- & late-1980s.
- In 1992, world bank withdrew the funding, which was a victory for anti-dam activists.
- But in 2000 the Supreme Court approved the Construction of Sardar Sarovar Dam. The height will be 133m, which was lower than the proposed height 130m.

- Gujarat Govt. taken up the construction of the project / Dam.
- This movement has attracted the international attention.

National Test Range at Baliapal, Odisha

- In 1985, The Indian National govt. decided to construct a test base for missiles in the area of Baliapal in North Odisha, on India's Bay of Bengal coast.
- Its purpose was to research, produce and launch missiles and satellites.
- Baliapal was chosen as the location for a variety of military reasons, among them:
 - Its distance from major population centers, air & sea routes.
 - Its cyclone free.
 - Its distance from Pakistani radar surveillance.
- But the establishment of the missile base necessitated the eviction of more than 100,000 peasant farmers and fisherfolk from their homes and lands.
- 50,000 persons, strong opposition make it cancelled.

Conditions For Achieving The Goals Of Sustainable Development

- ① No Poverty - End poverty in all its forms everywhere.
- ② Zero Hunger - End hunger, achieve food security & improved nutrition and promote sustainable agriculture.
- ③ Good Health and Well-being - Ensure healthy lives & promote well-being for all at all ages.
- ④ Quality Education - Ensure inclusive & equitable quality education & promote lifelong learning opportunities for all.
- ⑤ Gender Equality - Achieve gender equality & empower all women & girls.

Strategies For Sustainable Development in India

- ① Technology - Eco-friendly, Culturally Suitable, resource efficient
- ② 3R - Reduce, Reuse & Recycle
- ③ Promoting Environmental Education & Awareness
- ④ Resource Utilization as per carrying Capacity
- ⑤ Science and Education
- ⑥ Improving Quality of Life, Including Social, Cultural and Economic Dimensions.

There are 8 National Missions which form the Core of the National Action Plan, representing the multi-pronged long term strategy.

① National Solar Mission :-

- ① Aim to contribute to India's long term energy security as well as its ecological security.
- ② This will substitute the conventional energy resources.

② National Mission For Sustaining the Himalayan Eco-system

- ① The purpose of this is to get a complete understanding of whether and to what extent the Himalayan glaciers are in recession and how the problem can be addressed.
- ② This aims make Indian agriculture more resilient to climate change by identifying new varieties of crops, especially thermal resistant ones & alternative cropping patterns.

③ National Mission on Enhanced Energy Efficiency :-

- This is under the Ministry of Power, will target improvements in energy efficiency in buildings, management of solid waste and accelerating modal shift to mass transport.

- ④ The National Water Mission
- ⑤ The National Mission for a green India.
- ⑥ The National Mission on Strategic Knowledge for Climate Change.

THE STOCKHOLM CONFERENCE (1972)

- The United Nations Conference on the Human Environment was an international conference convened under United Nations auspices held in Stockholm, Sweden from June 5-16, 1972.
- It was the UN's first major conference on international environmental issues, and marked a turning point in the development of international environmental politics.

Some Principles of the Conference:

- The protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world.
- Man bears a solemn responsibility to protect & improve the env for present & future generation.
- The natural resources of the earth must be safeguarded for the benefit.
- Economic and social development is essential for ensuring a favorable living and working environment.

BRUNDTLAND COMMISSION 1983

- The UN set up a commission to look at environmental issues in 1983.
- It was headed by the Norwegian PM, Gro Harlem Brundtland.

The report highlighted the ideas of sustainable development and defined it as:

Sustainable development is development that meets the need of the present without compromising the ability of future generations to meet their own needs".

- This was published in 1987.
- The report gathered different issues related to environmental problem and launched a comprehensive gateway to sustainability, which included social, economic, political - institutional & environmental criteria.
- The concept of sustainability created by the WCED has since been used and also redeveloped in the on going work with sustainability within different spheres.

RIO Declaration

- This was a short document produced at the 1992 UN Conference on Environment and Development (UNCED).
- This, informally known as the Earth Summit.
- It's main aim is to achieve sustainable development and a higher quality of life.
- It consists of 27 principles which intended to guide future sustainable development around the world.
- 175 countries have signed this Declaration.

3 Objectives

- ① To achieve sustainable Development.
- ② To reduce or eliminate unsustainable patterns of production and consumption.
- ③ To promote demographic policies.

MAIN FEATURES OF THE RIO DECLARATION

- The Rio declaration states that long term economic progress is only ensured if it is linked with the protection of the environment.
- This ~~possess~~ ethical vision proposes the environmental protection, human rights, equitable human development, and peace are interdependent and indivisible.

Kyoto Conference and pact on Global Warming 1997

- The Kyoto Protocol was adopted on 11 Dec 1997 and it was held at Japan, Kyoto. It was based on the principles set out in UNFCCC.
- Due to complex ratification process it came into force on 16 Feb 2005.
- Presently there are 192 parties.
- It was aimed to reduce the CO₂ emission & presence of greenhouse gases (CH₄, N₂O, CO₂, HFCs etc).
- It is international agreement for 37 industrialized nations plus the European Community to cut the emission of greenhouse gases because global warming have been increased.
- India, China & other developing countries were exempted from requirements of Kyoto Protocol primarily, because in developing countries, per capita emissions were low.
(more 100 countries were exempted)

UNIT-5

ENVIRONMENTAL EDUCATION IN THE SCHOOL CURRICULUM & MEANS TO SENSITIZE THE STUDENTS

Environmental Education at Primary, Secondary and Higher Education Level

- Environmental Education can be defined as a process that equips human beings with awareness, knowledge, skills, attitudes and commitment to improve environment
- E.E aims at developing in the child awareness & understanding of the physical and social environment in its totality.

Goals of Environmental Education

- It helps to develop the factual knowledge about the natural environment
- Foster more positive perceptions about the value of the natural world.
- Develop eco-friendly habits i.e. 3R.
- Engage student in environmental rejuvenation projects & actions.
- Develop student's psychological and spiritual relationship with nature.

The Components of Environmental Education

- ① Awareness and sensitivity
- ② Knowledge and understanding
- ③ Attitude of concern & motivation
- ④ Skill to identify & resolve the environmental challenges.
- ⑤ Participation initiatives.

5.1.1 ENVIRONMENTAL EDUCATION AT PRIMARY EDUCATION LEVEL

EE is imparted as EVS, which forms a common component of syllabus, prescribed by the States and CBSE. The textbooks for environmental studies which are prepared by N.C.E.R.T has taken cross curricular approach to teaching environmental concepts through language, mathematics about the environment. In classes I and II there is no separate EVS book. For classes III and IV, EVS textbooks are available. EE has been further reinforced under the art of healthy and productive living (AHPL) for which a single teacher's handbook has been developed for classes I to V.

The contents and concepts covered in these books are as follows:

1. Familiarisation with one's own body;
2. Awareness about immediate surroundings;
3. Need for food, water, air, shelter, clothing and recreation;
4. Importance of trees and plants;
5. Familiarisation with local birds, animals and other objects;
6. Interdependence of living and non-living things;
7. Importance of cleanliness and sanitation;
8. Importance of celebration of festivals and national days;
9. Awareness of sunlight, rain and wind;
10. Caring for pet animals;
11. Awareness about air, water, soil and noise pollution;
12. Need for the protection of environment;
13. Knowledge about the source of energy;
14. Importance of the conservation of water resources and forests and
15. Indigenous and traditional knowledge about the protection of environment.

5.1.2 ENVIRONMENTAL EDUCATION AT UPPER PRIMARY STAGE

The contents of textbooks present an extension and elaboration of the concepts introduced at the primary stage. The textbooks in Rajasthan and Madhya Pradesh (Classes VI-VIII) and in Karnataka (Classes V-VII) contain environmental concepts by and large in the textbooks of science and social science. The textbooks of Karnataka for class V in the subjects of science, social science and language have environmental ideas infused with these subjects. The State of Orissa, deals with the environmental concepts and concerns in its textbooks for science and geography. These are also included in a single textbook of history and civics. The NCERT textbooks of 'Science' and 'Social Science' have incorporated such concepts in the textbooks.

The major concepts dealt with in these textbooks are:

- Adaptation of living beings in environment;
- Natural resources;
- Water cycle;
- Food chain;
- Importance of plants and trees in keeping the environment clean;
- Classification of plants;
- Role of plants and animals in environmental balance and soil conservation;
- Ecosystems;

-
- Necessity of clean air for healthy living;
 - Animals and their characteristics;
 - Effects of environmental pollution and the consequences of air pollution-(i) Greenhouse effect. (ii) Ozone layer depletion and, (iii) increase in carbon dioxide;
 - Role of microorganisms in the environment;
 - Dependence of the community on the environment;
 - Basic knowledge about the Earth and its atmosphere;
 - Physical features of the country;
 - Population and environment;
 - Care and protection of livestock;
 - Necessity of wildlife protection;
 - Impact of deforestation;
 - Impact of industrialisation on environment; and
 - Role of civic society in protection of the environment, personal and public property including monuments.

5.1.4 ENVIRONMENTAL EDUCATION AT HIGHER EDUCATION LEVEL

This is the stage of diversification. Students opt for either the academic stream or the vocational stream. The treatment of concepts becomes deeper and more discipline oriented since the content caters to the demands of the concerned subject, as an independent discipline a comprehensive view about EE is not available in the textbooks. Majority of the concepts are found in the textbooks of biology, chemistry and geography, which are optional subjects. Students opting for any one of these subjects would accordingly benefit in different aspects of EE.

The coverage of EE concepts in the textbooks of various subjects includes:

- ❖ Environment and sustainable development;
- ❖ Atmospheric pollution- global warming,
- ❖ Greenhouse effect,
- ❖ Acid rain,
- ❖ Ozone layer depletion;
- ❖ Water pollution- international standards of drinking water

-
- ❖ Importance of dissolved oxygen in water,
 - ❖ Bio-chemical oxygen demand,
 - ❖ Chemical oxygen demand,
 - ❖ Land pollution,
 - ❖ Pesticides,
 - ❖ Ecology.

Major Constraints For Its Implementation at These Levels

Environmental constraints are any limitations on strategy options due to political, external, competition, social requirements and expectations, cultural or economic factors, technological or legal requirements.

→ There are many constraints and barriers to the widespread adoption & practice of environmental education.

- (i) Large class size
- (ii) Less no. of Teachers
- (iii) Lack of resources
- (iv) Poorly organised environment
- (v) Lack of clear integration of E.E
- (vi) No well organised programme education & environmental policies.
- (vii) Lack of coherent strategies & long term planning.
- (viii) Lack of standardization in textbook & other materials

TEACHER'S ROLE -

National Resource Center for Environmental Education

- The role of teachers and educators to spread awareness about environmental issues & problems is immense.
- Teachers play a pivotal role in transmitting the requisite knowledge, skills, attitudes & values, essential to restore.
- The major role of the teacher for spreading environmental awareness.
- It is essential that teachers should be properly trained themselves on environmental concepts & skills to impart training to learners.

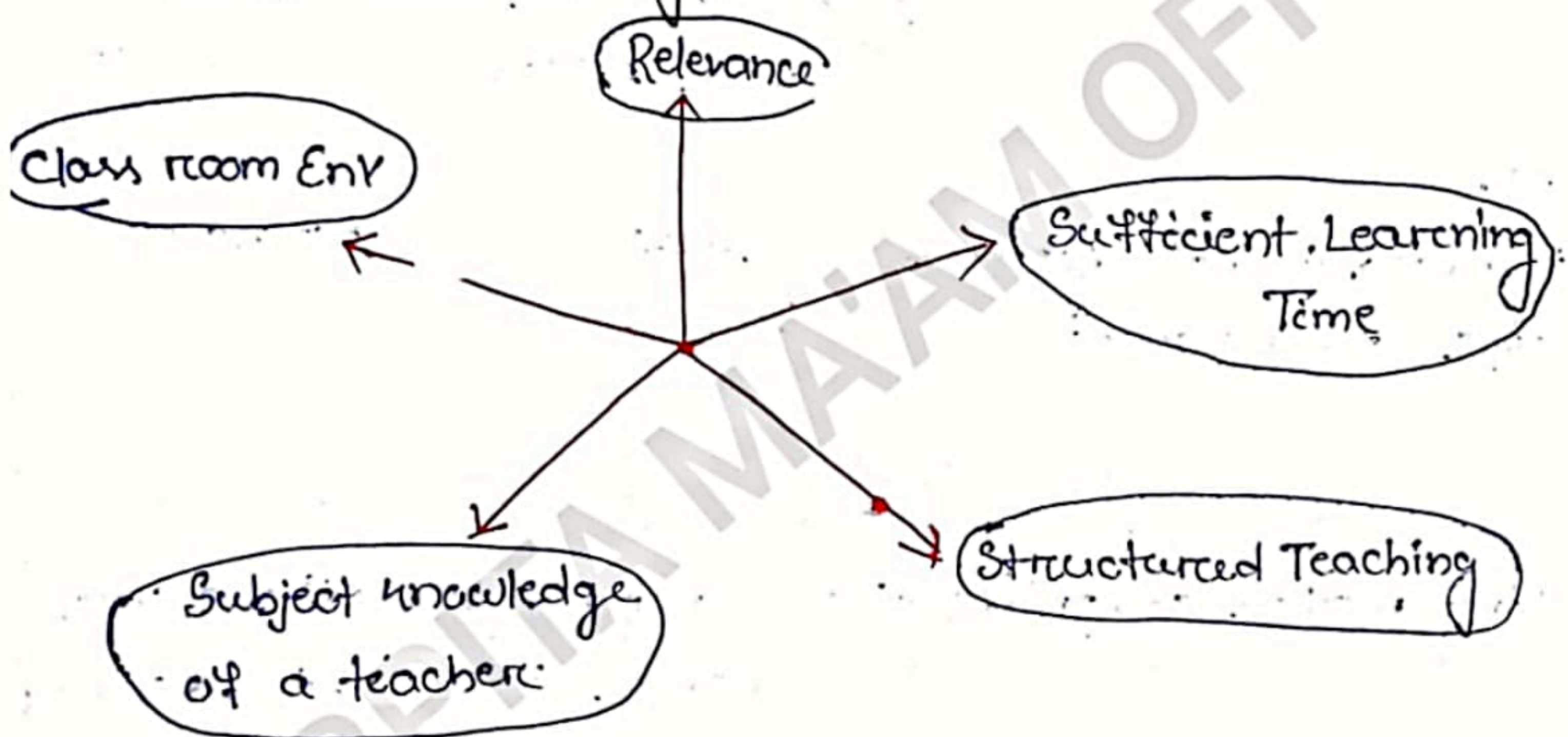
- Teachers should be well equipped with the knowledge method and teaching learning material to inculcate the right attitude and understanding.
- Distance education has emerged as a non-formal, learner-centric, cost-effective, alternative method of teaching-learning, across the world.
- Distance education employs a multimedia approach to instruction which involves a judicious blend of print & non-print media.
- Teachers are potential change agents and are capable of generating a workforce of enlightened, skilled and motivated learners.
- There is a need to train teachers in additional competencies regarding environmental education.

Characteristics of Good Teaching Method

- A teaching method comprises the principles & methods used for instruction to be implemented by teachers to achieve the desired learning by students.
- Technically speaking, teaching is an information giving process which flows from teacher to the student.
- The methods & approaches selected by the teachers to the teaching learning of environmental dimension of any subject have to be necessarily active & participatory in nature.
- This involves clear communication.
- Good relationship between teacher & students.
- This must expand students' interests.

- This increases the ability of the student to work in group
- This creates genuine attachment to work & desire to do it efficiently, honestly & thoroughly.
- It gets theory of cognitive development & Bruner's theory of concept formation support these beliefs.

According to UNESCO (2004) and Scheerens (2004) the main characteristics of good teaching related to a no. of broad categories.



Key Characteristics of Effective Teaching

- ① Pedagogical Knowledge
- ② Planning and preparation
- ③ Teaching experience
- ④ Self-reflection & modification of Techniques
- ⑤ Flexibility

Different Teaching methods are used to meet the purpose of making the students understand the subject.

① Knowledge vs. Information :-

→ Knowledge implies a complete understanding, or full comprehension, of a particular subject.

→ Information is the systematic organization and assembly of data to acquire or develop ideas beneficial for the education.

② Interactive Classrooms :-

Laptops, tablets, video conferencing & podcasts in classrooms play a vital role in today's classroom situation. This keeps the class room active and create the environment for interaction.

③ Constructivist Teaching Method :-

→ This is a Student - centric method.

→ Constructivist teaching methods embrace subsets of alternative teaching styles, including modelling, coaching & test preparation through rubrics scaffolding.

Few More Methods

④ Co-operative Teaching Method

⑤ Direct Teaching Method

⑥ Authority or lecture Method

⑦ Demonstration Method

⑧ Activity Method.

⑨ Group Method.

Seminar, Workshop, Problem-Solving, Field Trips & Survey Projects, Exhibition and other Methods

SEMINAR

- Personal Development Seminar
- Business Seminar
- Academic Seminar

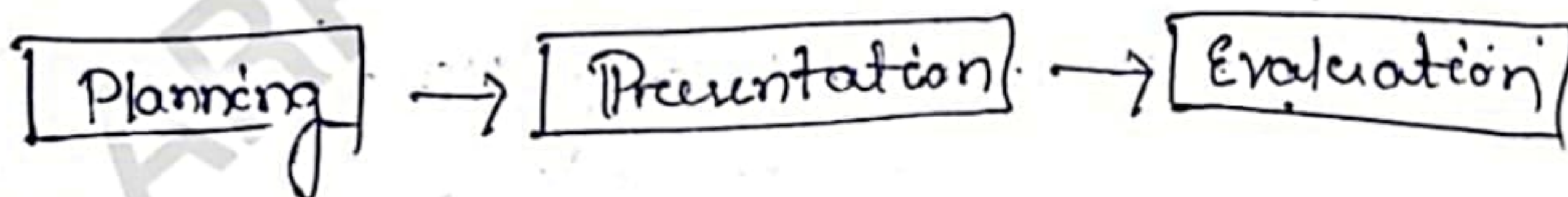
The word 'Seminar' is derived from the Latin word 'seminar' meaning 'Seed Plot'.

Definition:-

A seminar is a small group discussion in a formal setting with a clear agenda.

Purpose:-

- To promote the independent learning.
- To get students involved in discussions.
- To get students listen to one another.
- To foster responsibility for one's own learning.
- To provide an opportunity to the student to put on their opinion.



Procedure:-

- ① Organizer select the theme and organize the seminar.
- ② Chairman conduct the activities of the seminar.
- ③ Speaker speaks about the theme.
- ④ Other members - group discussion.
- ⑤ Participants seeks clarification and put questions.
- ⑥ Observers observes the activity of the seminar.

Advantages :-

- It promotes analytical thinking & creativity among students.
- Students learn communication skill and become articulate.
- Students gain experience of organizing an event.
- Students develop their participation & problem solving skills.

WORKSHOP

- Workshop is a meeting at which a group of people engage in intensive discussion and activity on a particular subject or project.
- A workshop comprises a small, selected group of teachers/experts drawn from actual working situations or related experts who theories on the activities.
- There are both on-site & on-site workshops are there, that the teachers should attain which continues their education.

The objectives are divided into two categories

↓
Cognitive Development

↓
Psychomotor Development

- A workshop could mean that a concentrated work on the part of experienced teachers to create certain educational materials.

Types of Workshop

PROBLEM SOLVING

The concise Oxford dictionary (1995) defines a problem as :-

"A doubtful or difficult matter requiring a solution" and "something hard to understand or accomplish or deal with".

→ All problems have 2 features in common: goals & barriers

Goal

Problem involved settling out to → Ex:- I am hungry.
achieve some objectives. 'Food' is my goal.

Barrier

Problem solving involves avoiding/overcoming the barriers/obstacles to achieve the goal.

→ Ex:- I am hungry but there is nothing to eat. I have to cook or buy food.

Characteristics :-

- Problem solving is goal directed.
- It involves series of operation.
- It involves cognitive processes.
- It is a ~~non~~ linear process.
- This needs patience and dedication.

Stages of Problem solving

(1) Identification of the problem :- Defining or identifying the nature of the problem.

(2) Structuring the problem

It involves developing a clear picture of the problem.

(3) Looking for possible solution :-

- You will generate a range of possible ways.
- You will evaluate it.

(4) Making a decision :-

- You will find a best solution from all other alternatives.

(5) Implementation :-

- Accept the decision and carry out it with the action.

(6) Monitoring / Feedback

- Reviewing the outcomes
- Seeking feedback.

(7) Developing problem solving skills

FIELD TRIPS

Definition:- A field trip is a visit to a place outside the normal classroom where children can see & try new thing.

- Field trip gives opportunity to a student to get out of the classroom & explore and experience something new.
- Field trip can be zoo, museum, farm, factory, science park or any other places.

Features of Field Trip :-

- Facilitate the learning of abstract concepts.
- Give vast ideas on the topic.
- Increase student-student & student-teacher interaction.
- Motivate students by increasing curiosity and interest.

Purpose of Field Trip :-

- To help students to analyze things in real form.
- Give students a real life experience so that their learning will be more meaningful and memorable.
- To learn topics deeply.
- To make student's learning enjoyable.
- Appreciate the importance of what they learn in the classroom.

The Importance of Field Trips :-

- Interactive Learning → Extension of classroom study
- Social Interaction → New Experiences → Entertainment

EXHIBITIONS

When the school, a department of school or a class put up their work for showing it to the people outside the school, such a show is called science exhibition.

Objectives

- To encourage students to apply their classroom learning into more creative channels.
- To provide opportunities fulfilling the higher intellectual and psychological needs.
- To stimulate them to plan their own project.
- To popularize activities among greater no. of students.

Advantage

- Build critical thinking skills among the pupil.
- Increase self-confidence of the learner.
- Improve co-operative and communication skills.
- Enhance scientific attitude and research skill.
- Develop the power of reasoning.
- Facilitate the students to update their knowledge in science.
- Improve creativity.

SURVEYS

Survey is a general view, examination or description of someone or something.

According to Instrumentation

(a) Questionnaire

(b) Interviews.

According to the Span of Time Involved

(a) Cross - Sectional Surveys

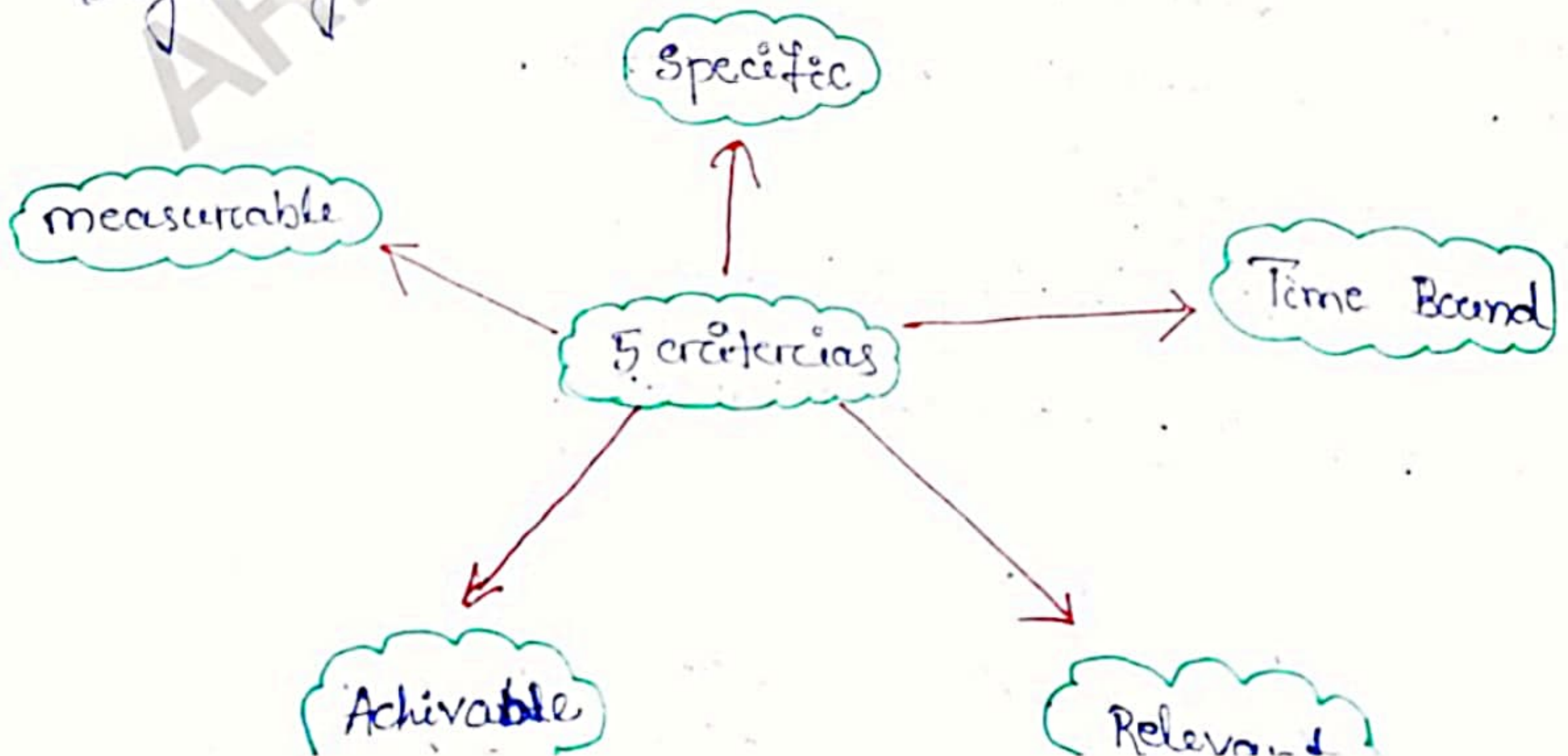
(b) Longitudinal Surveys.

PROJECT

→ Project is an individual or collective enterprise that is carefully planned to achieve a particular aim.

→ Project is defined as an effort to create or modify a specific product or service.

→ Projects are temporary work efforts with a clear beginning & end.



Role of I.T. and MEDIA in Environment & Human Health

IT: Information technology is the use of any computers, storage, networking and other physical devices, infrastructure & processes to create, process, store, secure & exchange all forms of electronic data.

* It is the fastest growing recent technology.

Media :- Media exists primarily to deliver entertainment, information and advertisements to a vast audience.

→ For most people, "the media" refers to the "mass media".

→ This is capable of communicating to large group of people, i.e. TV, radio newspapers etc.

A. Role of IT in Environment:-

→ Remote Sensing & GIS (Geographic Information Technology System) provides data and knowledge concerning the global environment as it is used for mapping & monitoring various natural resources.

→ IT is used for computer based modeling & simulation of environmental scenarios for analysis & prediction.

→ Disaster management.

→ Control over production.

→ Waste management.

→ Corporate responsibility.

B. Role of IT in Human Health

→ Audio-Visual & data communication for medical diagnosis & treatment.

→ Testing DNA, DNA finger printing etc.

- MRI, Sonography, X-ray, ultrasound etc.
- Laser Treatment
- Pathology etc. (Blood, stool, urine test).

C. Role of Media in Environment :-

- Environmental sustainability awareness.
- The role of mass media is important in spreading knowledge and educational level of environmental issues.
- This spreads environmental attitudes & behaviour.
- TV, radio, news papers highlight the environmental update and aware people.

D. Role of Media in Human Health :-

- The media is an importantly in any public health.
- It serves the role of being a source of correct information as well as an advocate for correct health behaviour.
- This cures people of rural belt.
- Mass media is the great health communication tool.